JOURNAL OF THE IRON AND STEEL INSTITUTE

VOLUME 161 — 1949

SUBJECT INDEX

References to papers and articles given in full text are indicated by the word (*Paper*) following the page number.

Indexing of Alloy Steels and Other Alloys : In the indexing of alloy steels, carbon and iron are ignored and the alloying elements contained in the steel are arranged in alphabetical order ; for example, all references to nickel–chromium–molybdenum steel will be found under the heading chromium–molybdenum–nickel steel. In the indexing of other alloys, carbon and iron, when present, are included in the title ; iron when present is always mentioned first and the other elements follow in alphabetical order, carbon being in all cases mentioned last. Examples : " Iron–silicon–carbon alloys " and " iron–chromium–nickel–carbon alloys."

Abrasion,
hard-facings, effect of welding, 67
silicon steel, effect on magnetic properties, 74
Abrasives, 68
Absorptiometric Analysis, determination of chromium, 171
Acid Bessemer Steel, for tubes, 256
Acid Electric Furnace Practice, slag control, 59
Acid Open-Hearth Process, 58
Acid-Resistant Steel, intergranular corrosion tests, 167 ; welding, 262
Activities, liquid metallic solutions, 150
Adhesion, metallic coatings, 158, 265
A.F.A. Grain Fineness Number, 60
After-Effect, in metals, 161
Ageing, lubricants, 66
strain-, welded structural steel, 263
Air,
compressed, applications, 66 ; for foundries, 257
Aircraft Engines, ceramic coatings, 160
Aircraft Materials, properties at low temperatures, 273
Aircraft Parts, fatigue, 269
Aircraft Propellers, heat treatment, 64 ; manufacture, 154
Air-Oxygen Mixtures, 58
Allis-Chalmers Manufacturing Co., foundry plant, 153 ; precision casting practice, 62, 258
Allotropy, helium, 392 ; iron, 392
Alloy Steel. *See* Steel
Alloying Elements, consumption by American steel industry, 75
effect in steel, hardness, 270 ; heat treatment, 63
Alloys, internal oxidation, 169 ; isomorphous with iron–chromium sigma phase, 78 ; weldability for high-temperature service, 66
aluminium, die steels for, 76 ; molten, action on cast iron, 78, 79 ; properties at low temperatures, 273
aluminium–silicon, molten, attack on cast iron, 395
chromium, fretting corrosion, 169
cobalt-tungsten, electrodeposition, 383
complex, classification, 392
creep-resistant, for gas turbines, 271
CSA, properties, 389
heat resistant, effect of dispersion hardening of austenite, 259
iron–beryllium–carbon, constitution and properties, 164
Alloys—*continued.*
iron–manganese–carbon, equilibrium with methane-hydrogen mixtures, 165
iron–nickel, for chemical plant, 173 ; polarization phenomena, 74
iron–nickel–carbon, austenite transformation, effect of nickel and molybdenum, 166
iron-nitrogen, nitrogen evolution, 163
iron–silicon–carbon, equilibrium with methane-hydrogen mixtures, 165
iron–tungsten, electrodeposition, 383
lead–tin, electrodeposition, 265
magnesium, deformation under longitudinal impact loads, 385 ; properties at low temperatures, 273
magnet, analysis, 171 ; properties, 270
manganese-arsenic, magnetic properties, 163
manganese-nitrogen, magnetic properties, 163
molybdenum, oxidation, 170
molybdenum–tungsten, analysis, 171
non-ferrous, properties at high temperatures, 389
tungsten, electrodeposition, 266
Alpax, molten, action on cast iron, 78, 79, 395
Alumina,
determination, in iron ore, 171 ; in ores, 171 ; in slag, 171
Alumina Bricks. *See* Refractory Materials
Aluminium,
corrosion, in sulphur dioxide, 395
deformation, under longitudinal impact loads, 385
determination, electrometric method, 170 ; in magnet alloys, 171
effect in malleable cast iron, annealing, 152
effect in molybdenum steel, 273
for automobile parts, 390
fretting corrosion, 169
properties, at low temperatures, 273
Aluminium Alloys,
die steels for, 76
molten, action on cast iron, 78, 79, 395
properties, at low temperatures, 273
Aluminium–Bronze, properties at low temperatures, 273
Aluminium–Chromium–Silicon Steel, effect of titanium, 389
Aluminium-Coated Steel,
catalytic oxidation of sulphur dioxide, 393
corrosion, by sulphur dioxide, 393
Aluminium Coatings, on steel, 159
Aluminium Crystals, straining by polishing, 77
Aluminium–Silicon Alloys, molten, attack on cast iron, 395
Aluminium Steel, graphitization, 271
Aluminium Sulphate, corrosion of metals, 394
Ammonia, recovery from coke-oven gas, 56
Ammonium Sulphate,
corrosion of metals, 394, 395
production from coke-oven gas, 373
Amplifier, for recording strain, 386
Analysis, use of norms, 395 ; use of quantometer, 398
absorptiometric, 171
colorimetric, 171, 276, 395, 396 ; effect of foreign ions, 277 ; mixtures of two coloured components, 396
electrometric, 170, 276
gravimetric, 171, 395
magnetic, 172
non-destructive, 396
photoelectric, 172
polarographic, 171, 275, 276, 395, 396, 397 ; tapping of capillary tube, 397 ; use of solid electrodes, 397
polarometric titration, 276
potentiometric, 276
photocolorimetric, 276
quantitative phase, 396
spectrographic, 171, 172, 275, 276, 277 395, 397
vacuum-fusion, 172
volumetric, 395
X-ray diffraction, 397
X-ray fluorescence, 275, 396
Angles, rolling, 155
Annealing, isothermal, 63, 153, 378
Annealing of,
malleable cast iron, effect of aluminium, 152 ; effect of boron, 152 ; effect of chromium, 152 ; effect of manganese, 65 ; oxidizing power of ore mixtures, 22
sheets, 154
strip, 154
Annealing Furnaces,
controlled atmospheres, 65
cover-type, 154, 378
for stainless steel, 65
for wire, 65
portable cover type, 65
Annealing Rate, for malleable cast iron, effect of manganese–sulphur ratio, 59
Anti-Fouling Compositions, 98, 160
Antiox Process, 159

pex Electrical Manufacturing Co., heat-treatment plant, 378
Appleby-Frodingham Steel Co., blast-furnace scaffolds, 295; section mills, 261; steel plant, 373
Arc Furnaces. *See* Electric Furnaces
Arc Welding. *See* Welding
A.R.D. Test, for thickness determination of coatings, 382
Armco Iron, hydrogen embrittlement during pickling, 271
Armco Steel Corp., corrosion testing station, 167
Armour Plate, chromium–nickel steel, welding, 156
Arsenic, determination in steel, spectrographic method, 397
Arsenic-Manganese Alloys, magnetic properties, 163
Atmospheres,
  determination of manganese compounds, 172
  heat-treatment, carburizing potential, 63
Auble Deep-Drawing Process, 379
Austempering, 63
Austenite,
  diffusion of carbon, 164
  dispersion hardening, effect on heat-resistance of alloys, 259
  retained, isothermal decomposition, 166; in steel, 166
  transformations, 166; atomic displacements, 167; in iron–nickel–carbon alloys, effect of nickel and molybdenum, 166; in nickel steel, 167; effect of stabilization, 166
  undercooled, stabilization, 273
Austenitic Steel,
  behaviour at high temperatures, 74
  residual stresses, 272
Australia,
  ferro-alloys used, 257
  iron industry, 255, 278
Austria, iron industry, 79
Automobile Axles, welding, 66
Automobile Bodies,
  drying, 160
  phosphate coating, 383
Automobile Crankshafts, flame hardening, 153
Automobile Parts,
  carbo-nitriding, 65
  deep-drawing, 260
  die-forging, 260
  heat treatment, 64
  plating, 264
  use of steel and aluminium, 390
  welding, 66
Automobile Spindles, forging, 65
Automobile Steel, hardenability bands, 162
Axles,
  automobile, welding, 66
  railway, fatigue, 161

Babcock and Wilcox Co., continuous casting process, 151
Bacteria, action in corrosion of pipes, 168, 394
Bainite, effect in chromium–molybdenum steel, 389
Balances, semi-micro, 76
Ballistic Testing Machine, 385
Balls, heating-up, 63
Banox Drawing Compound, 260
Barium Lubricant, 262
Barnes Manufacturing Co., methods of quality control, 62
Bars,
  cold-drawing, 379
  rolling, spread of material, 380
Basic Bessemer Process, nitrogen absorption, oxide-film theory, 149
Basic Bessemer Steel, nitrogen content, 149
Basic Bricks. *See* Refractory Materials
Basic Electric Furnace Practice, use of single slag, 58
Basic Electric Furnaces, manufacture of manganese steel, 374
Basic Electric Steel,
  cleanliness, 374
  silicate inclusions, 59
Basic Open-Hearth Furnaces, design, 256
Basic Open-Hearth Process,
  behaviour of oxygen, 149
  direct oxidation, 149
  sulphur removal, effect of sulphur in fuel gas, 58
Basic Refractories Inc., plant, 56
Basic Slag, microscopic examination, 374
Basicity, slag, estimation, 151
Basifrit, 56
Bauer Distillation Process, 373
Bauxite, reduction, 257
Beams, submerged-arc welding, 381
Bearings,
  chromium-plated, 158
  composition, 154
  construction and performance, 262
  lubrication, 66, 380
  scraping, 156
  self-lubricating, 262
  sleeve, 261
Belgium, mould facing materials, 60
Bend Tests, 385; determination of yield point, 268; peripherally supported discs, 268; upper yield point, 385
  bead welds, effect of electrode quality and welding skill on results, 156
  butt welds, effect of sheet thickness, 263
Bendix Method, for thickness measurement of tin coatings, 118; *Paper*, 382.
Bentonite,
  addition to moulding sand, 61
  chemical treatment, 61
  synthetic, 61
Benzole, recovery, 146
Beryllia. *See* Refractory Materials
Bessemer Steel,
  acid, for tubes, 256
  basic, nitrogen content, 149
Bibliography, nodular cast iron, 257; salt-spray tests, 395
Billet Heating Furnaces, 63, 258
Bimetals, for temperature control, 146
Biographical Notes, H. Allsop, 367; W. H. Alvey, 141; H. G. Baron, 141; A. V. Brancker, 141; P. W. Bygate, 367; S. S. Carlisle, 249; H. Leighton Davies, *facing* 1; A. Dorman, *facing* 177; A. M. Frankau, 249; J. G. Frith, 249; C. C. Hodgson, 141; H. H. Mardon, 367; D. F. Marshall, 366; P. R. Pallister, 141; G. R. Rigby, 367; J. A. Sanderson, 249; L. H. W. Savage, 141; E. W. Senior, *facing* 81; B. O. Smith, 250; O. A. A. Tenow, 249; J. S. Terrington, 367; H. C. White, 367
Blast,
  hot, effect on combustion in cupolas, 257; for cupolas, 257
Blast-Furnace Gas,
  analysis, 398
  control system, 146
  reduction of iron ore, 147
Blast-Furnace Plants, layout, 327
  Australia, 255
  British, 255
  Broken Hill Proprietary Co., 373
  Carnegie-Illinois Steel Corp., 148
Blast-Furnace Practice,
  British, 373
  catalysts for reduction, 373
  effect of coke quality, 57, 148
  variations in pig iron composition, 255
Blast-Furnace Slag, granulated, effect of heating on grindability, 57
Blast-Furnace Stores, varying turbulence, 147
Blast-Furnaces,
  behaviour of manganese, 148
  burdens, relation to fuel economy, 148, 373
  carbon hearths, 147, 255
  driving rate, 255
  jacking-up of shells, 255
  linings, materials for, 57; Russian standards, 147
  oxygen-enriched air, 148, 256
Blast-Furnaces—*continued.*
  profiles, 255, 373
  scaffolds, 295 (*Paper*)
  sulphur elimination, 148
  top pressure, 57
  use of titaniferous iron ore, 148
Blueing, iron, 69
B.N.F. Jet Test, for thickness determination of coatings, 382
Boiler Feed Pumps, corrosion, 79
Boiler Plates, corrosion, 79, 392
Boiler Practice, Germany, 54
Boiler Shells, cracking at riveted seams, 394
Boiler Steel, corrosion in hydrochloric acid, 394
Boilers,
  corrosion, 79, 167, 275
  feed water, 175
  maintenance, 155
  use of high-ash coal, 54
Bolts,
  cold heading, 260
  forging, 65, 260
  roll-threading, 260
Book Notices, 80, 175, 278, 399
Borings, steel, fusion into blocks, 373
Boron,
  determination, 276
  effect in cast iron, graphitization, 75
  effect in high-speed steel, 75
  effect in malleable cast iron, 271
  annealing, 152
  effect in steel, hardenability, 75
Brass,
  corrosion in sulphur dioxide, 395
  electrodeposition, 265
Brazil,
  electric smelting of iron ore, 57
  iron ore deposits, 371
Brazing, metals, 67, 381
Briquetting, coke breeze, 254
British Cast Iron Research Association, activities, 58, 152
British Ceramic Research Association, field of work, 146
British Iron and Steel Research Association, experimental furnaces, 255; wire-drawing research, 260
British Welding Research Association, activities, 156
Brittle Fracture, mild steel plate, 386
Brittleness,
  malleable cast iron, due to galvanizing, 73
  steel under tensile stress, 70
Broken Hill Proprietary Co., steel plant, 373
Bronze, electrodeposition, 265
Buffalo Bolt Co., galvanizing practice, 69
Bunkers, for iron and steel plants, 156, 361
By-Product Plants, fire prevention, 254

Cables,
  steel, corrosion, 79
  steel/aluminium, behaviour in service, 274
  wire, endurance, 76
Cadmium,
  determination, in nickel plating baths, 265
  electrodeposition, 69
Cadmium Plating Solutions, throwing power, 266
Calcium, determination in iron ore, 396
Calcium Oxide, determination in dolomite, 275
Calcium Silicide, effect in cast iron, 75
Calorimeters, flow-type, 64
Camera, X-ray, for precision measurements of crystals, 391
Canada, coal deposits, 54
Cannon, cast iron, early English, 85, 398
Carbide Tools,
  for planing cast iron, 264
  for roll turning, 263
Carbides,
  in alloy steel, 273, 391
  in chromium steel, 273
Carboanalyser, 395

Carbometer, 395
Carbo-Nitriding, 64, 65
Carbon,
  determination, 396 ; in ferro-alloys, 396 ; in steel, 397
  diffusion, in austenite, 164 ; in steel, 259
  effect in chromium–nickel steel, intergranular corrosion, 274
  effect in steel, spheroidization, 153
  graphitic, in cast iron, 391
  in gamma iron, electric charge, 270
  restoration, in decarburized material, 153
Carbon Dioxide,
  determination, in dolomite, 275
  emissivity, 55
Carbon Monoxide,
  indicator for, 173, 277
  reduction of iron oxide, 149
  reduction of metallic oxides, 148
Carbon Steel,
  banded structure, effect of composition and working 65
  corrosion, 75
  damping capacity, 388
  deformation, under longitudinal impact loads, 385
  forged, properties, 260
  graphitization, 271
  induction hardening, 153
  magnetic properties, 74
  properties, 389
  structure, 165
Carbonization,
  distillation period, 372
  low-temperature, 372, 373
Carbonization Processes,
  Disco, 372, 373
  Koppers-Bruay, 372
  Roberts, 372
  Schrot, 373
  Wisner, 372
Carburization,
  gaseous, 63, 153, 259, 378
  pack method, 378
  selective, use of copper coatings, 158
Carburization of,
  steel, sulphide penetration, 17
Carnegie-Illinois Steel Corp., blast-furnaces, 148 ; plant, 255 ; plate mill, 155 ; slab furnaces, 377
Carnegie Institute of Technology, cyclotron, 379
Case-Hardening,
  Carbo-Nitriding process, 64
  measurement of case-depth, 73
Cast Iron,
  acicular, properties, 272
  alloy, uses, 272
  analysis, spectrographic methods, 276
  attack, by molten aluminium alloys, 78, 79, 395
  bronze-welding, 67
  castability, 152
  chromium additions, 59
  compression tests, preparation of specimen, 71
  corrosion, by sulphates, 394 ; in sulphur dioxide, 395
  desulphurization, by soda ash, 152
  determination, chromium, 276; gases, vacuum-fusion method, 172
  developments, 390
  effect of calcium silicide, 75
  effect of phosphorus, 271
  flame cutting, 381
  gases in, 62
  graphitic carbon, 391
  graphitization, effect of chromium, 75 effect of elements, 75
  grey, properties, 272 ; solidification, 62
  hardenability, 73
  high-duty, developments in Great Britain, 164
  inverse chill, 377
  machinability, 157
  malleable. *See* Malleable Cast Iron
  manufacture, in rotary furnaces, 59
  metallic cementation, 75
  molybdenum–nickel, hardenability, 73; properties, 272
  nickel, non-magnetic
  nickel additions
Cast Iron—*continued.*
  Ni-Resist, properties, 272
  Ni-Tensyliron, properties, 272
  nodular, bibliography, 257
  planing, carbide tools for, 264
  preparation for plating, 67
  properties, 75
  reinforcement, with steel inserts, 272
  silicon, properties, 271 ; properties at high temperatures, 389
  tensile tests, effect of shape of test piece and speed of testing, 70
  tests, 75
  tinning, 159, 383
  welding, electrode coatings for, 262
  white, solidification, 62
Cast Iron Cannon, early English, 85
Cast Iron Structural Diagrams, 77
Cast Steel,
  dendritic structure, 77
  properties, 272
Castability, cast iron, 152
Casting,
  centrifugal, 62, 152, 258 ; German practice, 62 ; mould coatings for, 258
  continuous, steel, 59 ; Williams process, 151
  die, metals, 379
  investment, 377
  precision, 61, 62, 258, 377 ; stainless steel parts, 152 ; use of permeable plaster, 61 ; use of plastic patterns, 62
Casting of,
  cannon, early methods in Britain, 398
  cast iron crucibles, 61
  large ingots, 375
  worm shafts, 61
Castings,
  advantages in use, 164
  chilled, 61
  cleaning, 67
  crack detection, use of oil and chalk, 72
  defects, prevention, 62 ; rat tail, 62
  feeding, 61
  gamma-ray inspection, 74
  gates, removal, 153
  gating, 61, 152, 377
  iron, for hydro turbines, 272 ; permanent moulds, 152 ; porosity, 62 ; thin, 62
  precision, heat treatment, 378
  quality control, 62, 257
  repair by welding, 67, 157, 381
  residual stresses, 72
  risers, dimensioning, 61
  stainless steel, use of core moulds, 60
  steel, action of mould surface, 60 ; burning on, 377 ; fluidity, 377 ; hot tears, 258, 377 ; solidification, 153
Catalysts, for reduction in blast-furnace, 373
Cathodic Protection,
  pipes, 79, 275, 394, 395
  use of zinc, 168, 274
  water tanks, 274, 393, 395
Cementation,
  dispersed, 75
  metallic, cast iron, 75
Cementation of, tool steel, 153
Central Iron and Steel Co., duplex process 58
Centrifugal Casting. *See* Casting
Ceramic Coatings for aircraft engines, 160
Chains,
  roller, testing, 161
  welded, production, 67
Charcoal, use for moulding sand, 60
Charging,
  open-hearth furnaces, 191 (*Paper*) ; time studies, 206
Charging Rate, open-hearth furnaces, effect of heat transfer, 212
Chemical Industry, corrosion problems, 167 ; use of stainless steel, 79
Chemical Plant, metals for, 173
Chill, inverse, in cast iron, 377
Chilled Castings, 61
Chilled Wheels, improvements, 60
Chromansil Steel, spot welded, effect of heat treatment, 263
Chromated Coatings, 70
Chromatography, 395
Chrome Refractories. *See* Refractory Materials
Chromite Ore, preparation, 372
Chromium,
  addition to cast iron, 59
  determination, in cast iron, 276 ; in ferro-chromium, 171 ; in ferro-chromium, spectrochemical method, 172 ; in high-speed steel, absorptiometric method, 171 ; in iron and steel, 396 ; in iron and steel, colorimetric method, 276 ; in iron and steel, photoelectric method, 172 ; in iron and steel, polarographic method, 397 ; in iron and steel, semi-microchemical method, 171 ; in malleable cast iron, 396 ; photometric method, 171
  effect in cast iron, graphitization, 75
  effect in chromium–nickel steel, intergranular corrosion, 274
  effect in malleable cast iron, annealing, 152
  effect in molybdenum steel, 273
  effect in steel, martensite formation, 166 ; spheroidization, 153
  electrodeposition, 68, 69 ; effect of high-frequency currents, 383
  electrolytic polishing, 76
  pyrolitic deposition, 159
  reactions, in high vacuo, 170
Chromium Alloys, fretting corrosion, 169
Chromium Coatings,
  for bearings, 158
  gas content, 158, 159 ; effect of heat treatment, 159
  hard, 68
  hardness, 158 ; effect of heat treatment, 159
  porous, 68 ; Van der Horst method, 265
  structure, 265
  wear tests, 158
Chromium–Manganese–Iron Alloys, heat resistance, effect of dispersion hardening of austenite, 259
Chromium – Manganese – Molybdenum – Nickel–Tungsten Steel, properties, 389
Chromium–Molybdenum–Nickel Steel,
  creep, 388
  heat treatment, 378
  properties at high temperatures, 389
  stress-corrosion cracking, 168
Chromium–Molybdenum Steel,
  effect of bainite, 389
  effect of columbium, 270
  graphitization, 271
  properties, 272
Chromium–Molybdenum ungsten Steel, heat treatment, 378
Chromium–Nickel–Iron Alloys, heat-resistance, effect of dispersion hardening of austenite, 259
Chromium–Nickel Steel,
  armour plate, welding, 156
  corrosion, 75
  determination of oxygen, 277
  effect of composition, 168
  for chemical plant, 173
  intergranular corrosion, 392 ; effect of elements, 274
  properties, at high temperatures, 74, 389 ; at low temperatures, 273
  residual stresses, 272
  welded, effect of weld metal composition, 381
Chromium–Nickel–Vanadium Steel, heat treatment, 259
Chromium Ore, reduction, 257
Chromium Plating Baths,
  maintenance, 68
  use of plastic beads, 159
Chromium–Silicon Steel,
  grain growth, 318 (*Paper*)
  grain size, 81 (*Paper*)
Chromium Steel,
  carbide phase, 273
  determination of manganese, potentiometric method, 276
  forged, properties, 260
  fretting corrosion, 169
  grain size, effect on martensite transformation, 166
  magnetic properties, 74

Chromium Steel—*continued.*
polymorphic transformations, effect of manganese, 78
properties, 76, 272, 389; at high temperatures, 389
Chromium–Tungsten–Vanadium Steel, heat treatment, 378
Chromium–Vanadium Steel, heat treatment, 259
Chromizing, steel, 68, 153, 383
Chutes, for iron and steel plants, **156**
Cinematography, open-hearth flames, 374
Clad Steel,
for oil refinery equipment, 395
stainless, uses, 173
Clay,
determination of aluminium, electrometric method, 170; of sodium, 278
Clay Industries, power requirements, 57
Cleaning, cathodic, 264
Cleaning of,
castings, 67
metals, 67, 381
producer gas, Whessoe plant, **56**
wire, 67
Cleanliness, basic electric furnace steel, 374
Coal,
analysis, 398
determination, of moisture content, 278; of sulphur, 173, 278; of volatile matter, 278
drying, 254
electrical resistance, 55
high-ash, for boilers, 54
Illinois, coking properties, 55
Lorraine, coking properties, 55
low-ash, coking, 254
non-coking, production of coke, 372
oxidation, 55; prior to coking, 372
preparation, 146
pulverised, burning, 146
sorting, according to caking tendency, 254
volume changes, during coking, 55
Coal Deposits,
Great Britain, 253
Tanganyika Territory, 253
Vancouver Island, 54
Coatings,
aluminium, on steel, 159
anti-corrosive, 266
bituminous, for pipes, 266
ceramic, for aircraft engines, 160
chromated, 70
chromium, for bearings, 158; gas content, 158, 159; hard, 68; hardness, 158; hardness, effect of heat treatment, 159; porous, 68; porous, Van der Horst method, 265; structure, 265; wear tests, 158
cobalt, properties, 383
copper, for selective carburization, 158
electrodeposited, adherence, 158, 265; exfoliation, 265; metallurgical aspects, 158; porosity, 383; properties, 68; quality, 68; thickness determination, 382; thickness determination, effect of internal stress, 383; thickness measurement, 158
electrostatic, 160
enamel, 160; preparation of metals for, 67, 157, 264, 382; sprayed, 94
ferrosilicon, effect of nitric acid, 159
for wire-drawing, 260
iron oxide, change in thickness with temperature, 170
lacquer, anti-corrosive, 266; evaluation, 383; porosity measurement, 394
lead, thickness determination, jet test, 68
metallic, diffusion, 158; porosity, 158; removal from scrap, 399
nickel, action of organic sulphonates, 265; heavy, 265; peeling, 69; properties, 265
non-metallic, protective value, 94
organic, 69, 266; exposure tests, 68; preparation of metals for, 67
oxide, Thermoxyd process, 69
paint, protective value, 394; shrinkage, 384; treatment of metals for, 69; weathering tests, 266
Coatings—*continued.*
peelable, 160
phosphate, 69, 159; for automobile bodies, 383; for drawing, 379
plastic, for pipes, 383
protective, corrosion tests, 78
protective value, 394
pyrolitic, 159
sprayed, 384
tin, chemical stability, 266; flowing, 63, 69, 159; thickness measurement, Bendix method, 118 (*Paper*), 382; thiocyanate porosity test, 266
welded, wear resistance, 156
zinc, chemical treatment, 265
Cobalt,
determination in magnet alloys, 171; with nickel, electrometric titration, 276
Cobalt Coatings, properties, 383
Cobalt–Tungsten Alloys, electrodeposition, 383
Cockerill Co., coking plant, 254
Coefficient of Elasticity, variation during deformation, 269
Coefficient of Friction, in rolling, 71
Coke,
contraction, during coking, 254
cooling, 254
determination, of sulphur, 278
dry-cooling, 103 (*Paper*), 372
foundry, German, 59
gasification, in producers, 56
lump density, 146
poor quality, for cupolas, 59
quality, effect on blast-furnace practice, 57, 148
reactivity, 56
sampling, 146
screening, 146
Coke Breeze, briquetting, 254
Coke-Cooling Plants, effect on fuel balance of integrated works, 114; waste heat recovery, 104
Coke-Oven Gas,
ammonia recovery, 56
analysis, use of Orsat apparatus, 398
control system, 146
production of ammonium sulphate, 373
uses, 254
Coke-Oven Plants, layout, 341
Coke Ovens,
increased gas production, 146
Petit, 55
Coking of,
coal, low-ash, 254; prior oxidation, 372
non-coking coal, 372
resin, 55
Coking Industry, German, 372; United States, 146
Coking Plant, John Cockerill, 254
Coking Practice, German, 372
Coking Process,
contraction of coke, 254
volume changes of coal, 55
Coking Properties,
Illinois coal, 55
Lorraine coal, 55
Coking Tests, 372
Cold-Drawing, bars and tubes, 379
Cold Forging, 260; tool steel, 65
Cold Heading, bolts, 260
Cold Punching, nuts, 260
Cold Rolling, effect of speed, 380; terms and theories used, 380
Cold-Work, effect on steel, spheroidization, 153; for increase of fatigue limit, 269
Cold-Worked Metals, X-ray line broadening, 271
Colombia, iron ore deposits, 371
Colorado Fuel and Iron Corp., ore preparation plant, 253
Colorimetric Analysis, 395, 396: effect of foreign ions, 277; mixtures of two coloured components, 396
determination, of molybdenum, 171; of nickel, chromium and manganese, 276
Columbia Steel Co., cold-reduction mill, 261; heat-treatment plant, 378; rolling-mill plant, 159; sheet mills, 380
Columbium,
determination, in ferro-columbium, **172**
effect in chromium–molybdenum steel, 270
effect in chromium–nickel steel, intergranular corrosion, 274
effect in molybdenum steel, graphitization, 389
effect in stainless steel, intergranular corrosion, 78
effect in tungsten high-speed steel, 273
Combustion, flameless, for forge furnaces, 258; premixing of gas and air, 372; submerged, 157
Combustion Processes, study with models, 372
Combustion Products, radiation, 55
Comparator, 270
Compression,
creep of metals, 74
uniaxial, propagation of plasticity, **72**
Compression Tests, cast iron, preparation of specimen, 71
Concentration,
manganese ore, 253
spathic ore, 145
Concentration Plant, Sierra Leone, 372
Concrete, prestressed, 74
Conductivity,
electrical, ferromagnetic substances at low temperatures, 270; silica melts, 151
thermal, moulding sand, 60
Control,
automatic, electric smelting furnaces, 255
cupola practice, 56
electric, strip mills, 155; wire-drawing machinery, 260
electronic, speed of rod mills, 261
gas consumption, 146
open-hearth furnaces, 58
quality, castings, 257; statistical methods, 62, 158
rolling-mill motors, 154
slag, 373
temperatures, in gas-fired furnaces, 254; use of bimetals, 146
vacuum furnaces, 56
Control Instruments, electronic, for iron and steel works, 163
Control Systems, for multiple fuel, 56
Controller, for loading pig iron into wagons, 45
Converters,
effect of shape on nitrogen content of steel, 255
manufacture of malleable cast iron, 60
oxygen-enriched air, 256, 377
side-blown, 58; effect of blowing procedure on nitrogen content of steel, 255; oxygen-enriched air, 58, 150
Conveyor Frames, galvanizing, 265
Conveyors, for iron and steel plants, 156, 361
Cookers, electric, cast-iron heating plates, 75
Cooling, coke, 254, 372; forgings, 259
Cooling Rate, dilatometric determination, 269; effect on ingots, 375
Copper,
corrosion, 75; in sulphur dioxide, 395
determination, in ferro-titanium, **171**; in magnet alloys, 171; in permalloy, spectrographic method, 277; in steel, 277; in steel, polarographic methods, 276
electrodeposition, 69
oxidation, 170
Copper Alloys, internal oxidation, 169
Copper Coatings, for selective carburization, 158
Copper Plating Baths, 68
Core Binders, 61, 152, 258; evolution of gases, 377; strength and hardness, 152; use of resin, 152
Core Blowers, 258
Core Blowing, 61
Core Boxes, 61
Core Moulds, for stainless steel castings, 60
Core Ovens, 61

Cores, baking, 61 ; drying, 61 ; knocking-out, 258 ; manufacture, 377
Corrosion, atmospheric, 392 ; formation of layers, 170 ; fretting, 169 ; intergranular, 78, 79, 167, 274, 392 ; measurement, 167 ; study by electron diffraction, 168, 169 ; theory, 274 ; use of thermodynamics for studying, 78 ; with oxygen depolarization, 78
Corrosion of,
acid-resistant steel, acid solution for testing, 167
alloy steel, in individual atmospheres, 393 ; in sea water, 79
boiler feed pumps, 79
boiler plates, 79, 392
boilers, 79, 167, 275
carbon steel, 75
chemical plant, 167
chromium-nickel steel, 75, 392 ; effect of elements, 274
copper, 75
desuperheaters, 79
gas pipes, 275
jets in vacuum pumps, 167
metals, in eucalypt sulphate pulp mills, 394 ; by flue gases, 395 ; by fluorine, 274 ; at sewage works, 394 ; in sodium chlorite liquors, 394 ; by sulphates, 394 ; in sulphur dioxide, 395
oil-refinery equipment, 274
painted steel, 394
pipes, 79, 168, 395 ; by bacteria, 394 ; retardation by lime, 78
stainless steel, 79 ; effect of titanium and columbium, 78 ; by fluids of human body, 395 ; by hot gases, 395
steel, by ammonium sulphate, 395 ; in gas-condensate fluids, 168 ; in hydrochloric acid, 394 ; in sea water, 393 ; in sulphuric acid, 394
steel cables, 79
tubes, effect of sulphitation, 168
turbine pumps, 167
water supply systems, 395
wire, 167
zinc in hot water 169
zinc-coated steel, in hot water, 169
Corrosion-Fatigue,
steel, effect of shot peening, 169 ; under asymmetric stress in sea water, 11 (*Paper*)
Corrosion Rates, colorimetric method for studying, 392 ; pulse polarization studies, 169
Corrosion Research, American, 78 ; British, 78, 167, 170
Corrosion-Resistant Materials, composition and uses, 395
Corrosion-Resistant Steel,
for textile industry, 76
welding, 262
Corrosion-Testing Laboratory, 79
Corrosion Testing Station, Armco Steel Corp., 167
Corrosion Tests, 91
accelerated atmospheric, 167
long-term, compared with laboratory, 78
protective coatings, 78
salt-spray, bibliography, 395
Corrugation, sheets, 154
Costing System, for foundries, 79 ; for steel plants, 79
Costs, power for steel plants, 80
Council Report, 187, 281
Cowper Stoves. *See* Blast-Furnace Stoves
Coyle Diagram, 77
Cracking,
boiler shells, at riveted seams, 394
stress - corrosion, chromium – molybdenum–nickel steel, 168
Cracks,
detection, in castings, use of oil and chalk, 72
effect on strength of metals, 73
in steel, during martensite transformation, 73
Crane Bridge Drives, gear ratios, 156
Crane Cabs, air-conditioning, 156
Cranes, gearing for, 156 ; ingot-stripping, 155 ; maintenance, 156 ; service requirements, 261
Crankshafts,
automobile, flame hardening, 153
cast, properties, 165
forging, 154
Creep,
chromium – molybdenum – nickel steel, 388
metals in compression, 74
steel wire, 74, 389
Creep Curves, mathematical treatment, 163
Creep-Resistant Alloys, for gas turbines, 271
Crucibles,
cast iron, casting, 61
for high-frequency furnaces, 254
Crushing, ore, 371
Crystal Structure, X-ray study, 165
Crystallography, X-ray, back-reflection diagrams, 77
Crystals,
electrolytically produced, formation and shape, 68
formation, in pure iron, 77
iron, production, 165
metal, straining by polishing, 77
precision measurement, 391
single, production, 165
C.S.A. Alloy, properties, 389
Cults Lime Works, limestone mining, 254
Cupola Practice, 59, 257 ; constant-charge system, 376 ; control, 56
Cupolas,
anthracite-coke mixtures, 257
blast variations, 257
charge calculation, 59
charging, 59
combustion processes, effect of hot blast, 257
explosions, due to scrap, 376
for supplying metal, to open-hearth furnaces, 58, 149
heating and melting rates, 376
hot blast, 257
manufacture, malleable cast iron, 59 ; synthetic pig iron, 57
poor quality coke, 59
tuyeres, dimension and shape, 59
Cutting,
flame, cast iron, 381 ; stainless steel, 157, 381
notched specimens, impact susceptibility, 264
thin specimens, by Microtome, 177
Cutting Oils, soluble, 157
Cyaniding, tool steel, 153
Cyclotron, forgings for, 379
Cylinder Bores, Van der Horst process of plating, 265
Cylinder Liners, hardening in salt baths, 64
Cylinders,
gas, stress-corrosion-cracking, 168
heating-up, 63
hollow, residual stresses, 269
Cylindrical Bodies, calculation of drawing strains, 379
Czechoslovakia, malleable cast iron manufacture 59 ; nationalization of steel industry, 174

Damping Capacity,
carbon steel, 388
measurement, 270
nickel steel, 388
Decarburization,
alloy steel, with mill scale, 377
in electric furnaces, with oxygen, 150
in open-hearth practice, with oxygen, 149
steel, 259
Decarburized Material, carbon restoration, 153
Deep-Drawing Sheets, German specification, 273
Defects,
in castings, prevention, 62 ; rat tail, 62
Defects—*continued.*
in ingots, 151 ; effect of teeming time, 151
in malleable cast iron, 62
in spring steel, effect on fatigue, 162
in steel, detection, 70
on tinplate, 266
Deformation,
elastic coefficients, variation, 269
elastoplastic, stress-strain relations, 71
generalized law, 71
hot, metals, 71
material in drawing and rolling, 380
metals under longitudinal impact loads, 385
plastic, circular diaphragm under pressure, 72 ; metals, 71 ; models for demonstrating, 71 ; stress-strain laws 71 ; theory, 379
speed measurement, 386
speeds, in impact tests, 385
Deformation Limits, calculation, 268
Deformation Region, in test specimens, 269
Deformed States, investigation, 161
Degasification, iron wire, 67
Degreasing, 67 ; Efco-Virgo process, 157
Density, coke, 146
Dephosphorization, pig iron, 57
Derbyshire, coal seams, 253
Descaling, Efco-Virgo process, 382 ; sodium–hydride process, 67, 157
Deseaming, flame, 157
Desiliconization, pig iron, 148
Desulphurization, cast iron by soda ash, 152 ; in high frequency furnaces, 150 ; pig iron, 57, 377
Desuperheaters, corrosion, 79
Detearing, electrostatic, 160
Detel Paints, 160
Diamonds, for polishing and grinding, 157
Didier Coking Process, 372
Die-Casting, 379 ; gravity, 62
Die-Forging, automobile parts, 260
Die Steels, for aluminium alloys, 76 ; heat-treatment, 65
Dies,
direct-fired heater, 175
drawing, carbide, 154 ; design, 260
extrusion, design, 260
forging, design, 259, 260 ; use of tool steel inserts, 65
heat treatment, 64
marking, tool steel for, 263
press, setting, 260
welding, 67
wire-drawing, carbide, 260 ; diamond 260 ; gauge for, 380 ; shape, 260
Diffusion, metallic coatings, 158
Dinas Bricks. *See* Refractory Materials
Direct Processes, 148
Disco Carbonization Process, 372, 373
Discontinuity Surfaces, in fields of stress, 72
Dissolution Rates, metals, measurement, 169
Distillation Process, Bauer, 373
Distillation Retorts, 146
Dolomite. *See* Refractory Materials
Dornin Process, for removing segregation in ingots, 375
Dow Chemical Co., corrosion-testing laboratory, 79
D.P.G. Iron Powder, 255
Drawing, calculation of strains, 379; flow of metals, 379 ; lubricants fo 66 ; phosphate coatings for, 379
cold-, bars and tubes, 379
deep-, 260, 379 ; Auble process, 379 Simultan process, 379
Drawing of,
automobile parts, 260
metals, 379
mild steel, 65
Nimonic, 65
sheets, 379
stainless steel, 65, 260
wire. *See* Wire Drawing
Drawing Dies, carbide, 154 ; design, 260
Dredger, for sludge clearance, 399
Drying, infra-red, 70
Drying of,
automobile bodies, 160

Drying of—*continued.*
coal, 254
cores, 61
moulding sand, 152
varnishes, 266
Drying Ovens, gas-convection type, 160; high frequency, 258
Duplex Process, cupola and open-hearth furnace, 58, 149
Duralumin, deformation under longitudinal impact loads, 385
Dust, determination in gas, 398
Dust Collectors, 62
Dynamometer, for measurement of impact, 71; for torsion tests, 161

Easton Manufacturing Co., moulding practice, 152
Ebosa Hardness Tester, 72
Ecole Supérieure de la Métallurgie et de l'Industrie des Mines, refractories laboratory, 254
Education, metallurgical, 174
Efco-Virgo Process for degreasing, 157, 382
Elasticity, new theory, 268
Elasticity Coefficient, variation during deformation, 269
Elasticity Modulus, variation with temperature, 71
Electric Furnace Practice, 374; composition of oxidizing slag, 374; scrap supply, 375; use of oxygen, 375
acid, slag control, 59
basic, use of single slag, 58
Electric Furnace Process, behaviour of hydrogen, 375; behaviour of nitrogen, 375
Electric Furnaces, automatic regulation, 255; development in Switzerland, 256; for malleablizing cast iron, 257; for smelting ore, 256; heating up, 63; manufacture of ferro-alloys, 376; oxygen for decarburization, 150; oxygen-enriched air, 256
arc, 374; manufacture of steel, 256
basic, manufacture of manganese steel, 374
high-frequency, 376; crucibles for, 254; desulphurization of steel, 150; for steel foundries, 60
induction, 257; linings, 147; smelting of iron ore, 57
radiation-arc 376
Electric Steel,
basic, cleanliness, 374; silicate inclusions, 59
Electrical Conductivity, ferromagnetic substances at low temperatures, 270; silica melts, 151
Electrical Equipment, protective finishes, 265
Electrical Resistance,
coal, 55
iron, high-purity, 87
shale, 55
Electrical Sheet Steel, properties, 387; silicon meter for, 171
Electricity Generating Stations, lightning protection, 155
Electrochemistry, metals, 70
Electrodeposited Coatings,
adhesion, 158, 265
exfoliation, 265
metallurgical aspects, 158
porosity, 383
thickness measurement, 158, 382; effect of internal stress, 383
Electrodeposition, control of solutions, 158; hydrogen evolution from steel, 271; preparation of metals for, 67; quality control, 158
Electrodeposition of,
brass, 265
bronze, 265
cadmium, 69
chromium, 68, 69; effect of high-frequency currents, 383
cobalt–tungsten alloys, 383
Electrodeposition of—*continued.*
copper, 69
iron–tungsten alloys, 383
lead–tin alloys, 265
nickel, 69
speculum metal, 265
tin, 69, 266; Ferrostan process, 69; Halogen process, 69
tungsten alloys, 266
zinc, 383
Electrodeposition Plant, installation, 68
Electrodeposits, metallography, 391; properties, 68
Electrodes, welding. *See* Welding Electrodes
Electrolizing, tools, 266
Electrolytic Iron, production, 149
Electrolytic Polishing. *See* Polishing
Electrometric Analysis, determination of aluminium, 170; simultaneous determination of nickel and cobalt, 276.
Electron Diffraction, for studying corrosion, 168
Electron Interference Microscopes, 76
Electron Theory, metals, 387
Electronic Control, speed of rod mills, 261
Electronic Instruments, for iron and steel works, 163
Electronics, uses in industry, 74
Electroplating, automobile parts, 264
Electroplating Baths,
alkaline cyanide, 265
analysis, 398
chromium, maintenance, 68; use of plastic beads, 159
copper, 68
nickel, determination of cadmium, 265; impurities, 68, 69; sodium sulphate, 69
throwing power, 158
zinc, alkaline, 69
Electroplating Practice, German, 265
Electroplating Processes, laboratory control, 382
Electroplating Solutions, determination of impurities, 265; throwing power, 266, 382
Electrotitrometric Measurements, 172
Embrittlement, hydrogen, during pickling, 264, 271
Emissivity, carbon dioxide, 55; steam, 55
Empire Plow Co., forge furnace plant, 377
Enamel Cottages, sprayed, 94
Enamelling, preparation of metals for, 67, 157, 264, 382; steel for, welding, 263
Enamelling of, steel, 160
Enamels, porcelain, "low temperature," 70; vitreous, bubble formation, 70
End-Quench Tests, 269; action of water jet, 73
Endurance, wire cables, 76
England. *See* Great Britain
English Steel Corporation, forging plant, 119 (*Paper*), 378; producer-gas cleaning plant, 56
Equilibria, metallurgical, graphical study, 150
Etching, deep, 73
Eucalypt Sulphate, corrosion of metals, 394
Expansion, thermal, nickel steel, 164
Explosions, in cupolas, due to scrap, 376
Exposure Tests, organic coatings, 68
Extension Diagrams, for determination of yield points, 161
Extrusion, X-ray diffraction specimens, 388
Extrusion Dies, design, 260

Fatigue,
corrosion-, effect of shot peening, 169; steel under asymmetric stress in sea water, 11 (*Paper*)
Fatigue of,
aircraft parts, 269; at low temperatures, 273
axles, 161
locomotive parts, 386
metals, 269
spring steel, effect of surface defects, 162
springs, effect of shot peening, 72
Fatigue of—*continued.*
steel, effect of surface-active substances, 386
welds, 381
Fatigue Limit, determination, 269; increase by cold-working, 269
Fatigue Testing Machine, for high temperatures, 162
Fatigue Tests, symbols and nomenclature, 386
Ferric Iron, determination, 276
Ferrite, delta, formation in alloy steel, effect on sigma phase, 392; determination by magnetic method, 74
Ferro-Alloys,
determination of carbon, 396
determination of iron, 172
manufacture, in electric furnaces, 376 in Germany, 376
use in Australia, 257
Ferro-Chromium,
determination of chromium, 171; spectrochemical method, 172
manufacture, mineralogy of slags, 376
Ferro-Columbium, determination of columbium, 172
Ferromagnetism, theories, 387
Ferro-Manganese,
determination of manganese, potentiometric method, 276
manufacture, 256
Ferro-Molybdenum,
analysis, 171
determination of molybdenum, 172
Ferro-Silicon, determination of silicon, 172
Ferrosilicon Coatings, effect of nitric acid, 159
Ferrostan Tinning Process, 69
Ferro-Tantalum, determination of tantalum, 172
Ferro-Titanium, determination of copper, 171
Ferro-Tungsten, analysis, 171
Ferrous Oxide, determination in iron ore, 171; transformation, 170
Film Adaptor, for microscopes, 390
Films, formation on metals, 169; optical determination, 169
oxide, on alloy steels, 168; breakdown in acid vapours, 170
thin, magnetization, 387
Firebricks. *See* Refractory Materials
Fire Prevention, by-product plants, 254
Fissures, transverse, in rails, 386
Flakes, in high-speed steel, 390; in steel 73
Flame Speeds, determination, 372
Flames,
in open-hearth furnaces, control, 58; cinematography, 374
Fleximeter, equilateral, for stress measurement, 386
Flotation, ore, 371
Flow,
gases, in open-hearth furnaces, 256
metals, 379
plastic, anisotropic sheet steel, 71
Flowing, tin coatings, 69, 159
Flue Dust, determination of ferrous oxide, 171
Flue Gas, corrosion of metals, 395
Fluidity, steel castings, 377
Fluorine, corrosion of metals, 274
Fluxes, for hot galvanizing, 69
Folding, metals, 379
Food Industries, use of stainless steel, 79, 173
Ford Motor Co., welding of automobile parts, 66
Forge Furnaces, 258; flameless combustion, 258; oil-fired, 377
Forgeability, metals, 379
Forged Steel, properties, 260
Forging,
cold, 65, 260
die-, 260
drop-, 379
extrusion, 65
flow of metals, 379
selection of steel, 260
Forging of,
automobile parts, 65, 260

Forging of—*continued.*
bolts, nuts and rivets, 65, 260
crankshafts, 154
magnets, 379
rolls, 379
tool steel, 65
Forging Dies, design, 259, 260; use of tool steel inserts, 65
Forging Plants, English Steel Corp., 119 (*Paper*); Reed Roller Bit Co., 63
Forging Practice, 259; British compared with American, 234; glossary of terms used, 259
Forging Presses, design, 231 (*Paper*); heavy, 378; installed in world's steel plants, 233
Forging Steel, inc'usions in tensile fractures, 161
Forgings, cooling, 259; induction heating, 64; properties, 76
Fosterite, 385
Fouling Samples, from ships, examination, 35 (*Paper*)
Foundries, costing system, 79; job evaluation system, 80; handling methods, 63; management, 63; mechanization, 62, 63; quality control, 62; refractories for, 57; time studies, 80; use of compressed air, 257
steel, use of high-frequency furnaces, 60
Foundry Coke, German, 59
Foundry Cores. *See* Cores
Foundry Industries, American, history, 398; German, 63, 79
Foundry Patterns, 152, 377; purchase, 61
plastic, 258; for precision casting, 62
Foundry Plants, Allis Chalmers Manufacturing Co., 153; Eaton Manufacturing Co., 152; Galt Malleable Iron Co., Ltd., 376; Lake City Malleable Inc., 257; Mackintosh-Hemphill Co., 377
Foundry Practice, developments, 173; Dutch, 257; German, 59; Hungarian, 173
Foundry Sand. *See* Moulding Sand
Foundrymen, training, 63, 174, 377
Fracture, cleavage, in steel, 72; mild steel plate, 161, 269, 386
France, iron ore deposits, 54; iron and steel industry, 58, 79; materials for lining furnaces, 57; mould facing materials, 60; moulding sand, 60; titanium ore deposit·, 54; water problems in steel plants, 399
Free-Cutting Steel, machinability, 263
properties, 390
Free Energies of Formation, oxides, 150
Freezing, metals, 63
Friction, internal, in metals, 388
Friction Coefficient, in rolling, 71
Fuel, preheating, 55; premixing for combustion, 372
multiple, control systems, 56
pulverized. *See* Coal, pulverized
Fuel Balance, integrated works, effect of coke-cooling plants, 114; relation to power load, 254; steel plants, 254
Fuel Economy, power stations, 55
Furnace Linings, French materials, 57
Furnaces,
blast. *See* Blast Furnaces
electric. *See* Electric Furnaces
forge. *See* Forge Furnaces
gas-fired, temperature control, 254
heat treatment. *See* Heat-Treatment Furnaces
high-frequency. *See* Electric Furnaces
molybdenum-resistance, 146
oil-fired, 56
open-hearth. *See* Open-Hearth Furnaces
reheating. *See* Reheating Furnaces
rotary, manufacture of cast iron, 59
rotary hearth, 64
silicon carbide, 396
slagging, air-cooled, 55
vacuum, control, 56; for high-temperature microscopy 273
Galt Malleable Iron Co., Ltd., plant, 376
Galvanic Currents, measurement around buried pipes, 169
Galvanized Steel, painting, 266; treatment prior to painting, 267
Galvanizing, effect of titanium and nitrogen in steel, 383; fluxes for, 69; without prior pickling, 69
Galvanizing of,
conveyor frames, 265
malleable cast iron, occurrence of brittleness, 73
small parts, 69
strip, 159
Galvanizing Baths, alloy additions, 159
Galvanizing Furnaces, electric, 265
Galvanizing Plants, mechanization, 265
Gamma Iron, carbon particles dissolved, electric charge, 270
Gamma Rays, for inspection of castings, 74; industrial uses, 388
Gas,
analysis, infra-red method, 172; instruments for, 172; photoelectric method, 172; use of mercury-sealed bulbs, 398
blast-furnace. *See* Blast-Furnace Gas
coke oven. *See* Coke-Oven Gas
flue, corrosion of metals, 395
long-distance, production, 56
mixed, interchangeability, 146
producer. *See* Producer Gas
town, for heat-treatment furnaces, 153
Gas-Condensate Fluids, corrosion of steel, 168
Gas Cylinders, stress-corrosion cracking, 168
Gas Engines, 66
Gas Interferometer, 172
Gas-Metal Equilibrium, elimination of thermal-diffusion error, 163; interstitial solution and diffusion, 163
Gas-Metal Reactions, study by reflection electron diffraction, 170; zone of metal phase consumption, 168
Gas Producers. *See* Producers
Gas Turbine Engine Parts, drawing, 65
Gaseous Fuel, distribution in iron and steel works, 56
Gases, determination in ca·t iron, vacuum-fusion method, 172; determination of dust, 398; determination in liquid steel, 278; in iron and steel, 62; in pig iron, 271
Gates, on castings, removal, 153
Gating, castings, 61, 152, 377
Gauges, resistance-strain, 261
Gear Steel, properties, 164
Gear Teeth, surface hardening, 64
Gears, lubrication, 66; pitting, 270
General Electric Co., method of sampling molten steel, 376
General Motors Corp., stamping practice, 260
Georges Fischer Method, for determination of grain fineness, 60
Germany, foundry coke, 59; measures for increasing production, 79; mould facing materials, 60; specification for deep-drawing sheets, 273; use of hot-blast cupolas, 257
boiler practice, 54
centrifugal casting practice, 62
coking industry, 372
electroplating practice, 265
ferro-alloy manufacture, 376
foundry industry, 59, 63, 79
iron ore deposits, 54
steel capacity, 398
steel industry, increase of production, 174; war effects, 174
Glass, safety, treatment of iron wire used, 67
Glass Furnaces, compared to open-hearth furnaces, 374
Glossary, terms used in forging, 259
Grain Growth, chromium-silicon steel, 318 (*Paper*)
Grain Size, chromium-silicon steel, 81 (*Paper*); effect on martensite transformation, 166; moulding sand, 152
Grain Structure, of solidifying metals, 391
Graphite, determination in wrought iron, 76
Graphitization,
cast iron, effect of chromium, 75; effect of elements, 75
molybdenum steel, effect of zirconium, columbium and titanium, 389
steel, 271
steel tubes, 73
Gravimetric Analysis, 395; determination of selenium, 171
Great Britain, casting of cannons, 398; history of iron ore smelting, 398; location of steelworks, *facing* 328; mould facing materials, 60; nationalization of steel industry, 174, 398; organization of steel industry, 174; steel-making capacity, 174; vanadium in iron ores used in industry, 371
blast-furnace plant, 255
blast-furnace practice, 373
corrosion research, 78, 167, 170
forging practice, compared with American, 234
Greiner and Klingenstein Diagram, 77
Grinding, steel, 264; use of diamonds, 157
Gunmix, 56
Halogen Tinning Process, 69
Hammers, pulverizing, reclamation by welding, 157
Handling, materials, 156, 175
Harbison-Walker Refractories Co., plant, 56, 254
Hard Facing, 262, 384; by fusion welding, 67
Hard-Facings, abrasion-resistance, effect of welding, 67
Hardenability,
alloy steel, 64
cast iron, 73
molybdenum-nickel cast iron, 73
steel, 153, 270; effect of boron, 75
Hardenability Bands, 270; automobile steel, 162
Hardenability Tests. *See* End-Quench Tests
Hardening,
bright, 64
critical speed, determination, 269
dispersion, of austenite, effect on heat-resistance of alloys, 259
flame, 153, 259
induction, 64, 153, 259
isothermal, 378
mechanism, 77
secondary, martensitic steel, 162
selective, 64
strain-, 162
surface, 64
theories, 173
work-, 72, 157
Hardening of,
automobile crankshafts, 153
cylinder liners, in salt baths, 64
gear teeth, 64
precision instruments, 64
stainless steel, during machining, 157
tool steel, 153
Hardness, determination by nomogram, 387; effect of internal stresses, 387; micro-, measurement, 162
Hardness of,
aircraft materials, at low temperatures, 273
alloy steel, effect of complex tempering cycles, 154
chromium coatings, 158
core binders, 152
steel, effect of elements, 270
Hardness Testers,
Ebosa, 72
for sheets, 269
micro-, 72
Poldi, 72
Rockwell, checking performance, 387
semi-micro, 76
Warman Penetroscope, 269
Hardness Tests, 73; malleable cast iron, 72; pinions, 162
Hastelloy, corrosion by sulphates, 394; investment casting, 377

Hastelloy C, for chemical plant, 173
Heading, cold-, bolts, 260
Heat,
specific, iron, high-purity, 87
waste, recovery from coke-cooling plants, 104
Heat Balance, open-hearth furnaces, 374
Heat Exchangers, heat transfer, 55
Heat of Fusion, iron carbide, 270 iron silicide, 270
Heat Resistance, alloys, effect of dispersion hardening, 259
Heat-Resistant Steel, heat treatment, 153; welding, 156, 262
Heat Transfer, 377; effect on open-hearth charging rate, 212 (*Paper*); in heat exchangers, 55; in open-hearth furnaces, 256; study with models, 372
Heat Treatment, effect on chromium coatings, hardness and heat treatment, 159; effect on nickel steel, 164; effect on spot-welded Chromansil steel, 263; German and English terms used, 63; in salt baths, 63, 258; isothermal compared with conventional methods, 63; time studies, 259
Heat Treatment of,
aircraft propellers, 64
automobile parts, 64
chromium–molybdenum–nickel steel, 378
chromium–molybdenum–tungsten steel, 378
chromium–nickel–vanadium steel, 259
chromium–tungsten–vanadium steel, 378
chromium–vanadium steel, 259
die steels, 65
dies, 65
heat-resistant steel, 153
high-speed steel, 63, 153
precision castings, 378
precision instruments, 64
sheets, 153
stainless steel, 153, 378, 390; in salt baths, 259
steel, effect of alloying elements, 63
tool steel, 378
Heat Treatment Atmospheres, 65, 153, 378; carburizing potential, 63
Heat Treatment Furnaces, gas-fired, 153; rotary-hearth, 64; support mechanisms, 377; town gas-fired, 153
Heat Treatment Plants, Apex Electrical Manufacturing Co., 378; Columbia Steel Co., 378
Heating,
electric, strip, 63
induction, 64, 258, 259; power absorbed by oscillatory circuit, 64; spiral springs, 153; transformation of steel, 64; varnishes, 266
radio-frequency, 64, 378
Heating Furnaces. *See* Reheating Furnaces
Heliarc Welding, 156; characteristics of arc, 66
Helium, allotropy, 392
Hexagons, rolling, 155
High-Speed Steel,
determination of chromium, absorptiometric method, 171
effect of boron, 75
flakes, 390
heat-treatment, 63, 153, 378
isothermal annealing, 378
properties, 273
tungsten, effect of columbium, 273
History, alloy steel, 173; American foundry industry, 398; casting of cannons in Britain, 398; early ironworking at Ticehurst, 16 (*Paper*); English cast-iron cannon in 16th century, 85; Hungarian foundry practice, 173; medieval ironworks at Monmouth and Osbaston, 326; metallurgy, 173; stainless steel, 173; wire-drawing machinery, 379
Holland, foundry practice, 257; iron content of soils, 54
Hot-Blast Stoves. *See* Blast-Furnace Stoves
Hungary, foundry practice, history, 173
Hydraulic Equipment, maintenance, 155
Hydrochloric Acid, corrosion of steel, 394; solubility of iron, effect of surface condition, 393
Hydrogen, behaviour in electric furnace process, 375; determination in iron and steel, 172; determination in liquid steel, 277; evolution from steel during electroplating, 271
Hydrogen Embrittlement, during pickling, 264, 271
Hy-Tuf Steel, 164

Illinois Coal, coking properties, 55
Ilmenite, reduction, 257
Impact, measurement with electrical dynamometer, 71
Impact Loads, longitudinal, deformation of metals, 385
Impact Properties, aircraft materials at low temperatures, 273
Impact Strength,
nickel steel, 164
weld metal, effect of temperature, 263
Impact Susceptibility, in cutting notched specimens, 264
Impact Tensile Tests, measurement of forces, 72; piezoelectric recording of tension, 70
Impact Tests, speed of deformation, 385; steel under compression, 161
Inclusions,
determination in steel, photocolorimetric method, 277
identification, 374
in alloy steel ingots, 151
in electric furnace steel, 374
in steel, elimination, 376; isolation, 77
in tensile fractures, of forging steel, 161
manganese-sulphide, identification, 273
non-metallic, distribution in steel, 278; isolation, 177; morphology, 77
silicate, in basic electric steel, 59
Inconel, corrosion by sulphates, 394
India, petrographic data of refractories, 147; properties of refractory materials 147; steel capacity, 255
Induction Furnaces. *See* Electric Furnaces
Infra Method, of gas analysis, 172
Infra-Red Absorption Power, metals, 163
Infra-Red Drying, 70
Ingot Bogies, 66
Ingot Moulds, heat equilibrium with ingots, 59; manufacture, 61, 258; thickness, effect on ingots, 375
Ingot Stripping Cranes, electric counterweights, 155
Ingots,
alloy steel, inclusions, 151
casting, 375
defects, 151; effect of teeming time, 151
density variations, 151
effect of pouring temperature, mould thickness and cooling rate, 375
electric furnace steel, inclusions, 374
heat equilibrium, with mould wall, 59
hollow, production, 153
octagonal, pouring and stripping, 375
segregation, 374; Dornin process for removal, 375
solidification, 374
structure, 151
Inhibitors, effect on steel, action of sulphuric acid, 169; in pickling, 382
Instrumentation, open-hearth furnaces, 58
Interferometer, gas, 172
International Nickel Co., corrosion-testing laboratory, 79
Iron,
allotropy, 392
analysis, polarographic, 275
cast. *See* Cast Iron
corrosion, in sulphur dioxide, 395
determination, in ferro-alloys, 172; in ores, 171; in slag, 171
effect of oxygen, on contact potential difference, 393
electrolytic. *See* Electrolytic Iron
extraction, by ether, 172
gamma, carbon particles dissolved, electric charge, 270

Iron—*continued.*
high-purity, specific heat and resistivity, 87 (*Paper*)
liquid, combustion of manganese, silicon and sulphur, 256; sulphur activity, 148
malleable. *See* Malleable Cast Iron
oxidation, 170
oxidation-reduction potential, 392
passivation, by oxygen, 393
pure, crystal formation, 77
reactions in high vacuo, 170
rust formation, 274
solubility, in hydrochloric acid, effect of surface condition, 393
sponge. *See* Sponge Iron
transformations, 78
trivalent, determination, 171
world production, 398
Iron Alloys, internal oxidation, 169
Iron–Beryllium–Carbon Alloys, constitution and properties, 164
Iron Carbide, heat of fusion, 270
Iron–Carbon System, 392
Iron–Chromium System, sigma phase, alloys isomorphous with, 78
Iron Crystals, single, production, 165; straining by polishing, 77
Iron Industries,
Australian, 255, 278
Austrian, 79
British, nationalization, 174; organization, 174
Czech, nationalization, 174
French, 58, 79
German, increase of production, 174
Wealden, 173
Iron–Manganese Alloys, grain size, effect on martensite transformation, 166
Iron–Manganese–Carbon Alloys, equilibrium with methane-hydrogen mixtures, 165
Iron–Nickel Alloys, for chemical plant, 173; polarization phenomena, 74
Iron–Nickel–Carbon Alloys, austenite transformation, effect of nickel and molybdenum, 166
Iron Nitride, structure, 392
Iron–Nitrogen Alloys, nitrogen evolution, 163
Iron–Nitrogen–Carbon System, 392
Iron–Nitrogen System, 392
Iron Ore,
analysis, ignition losses, 275; spectrochemical, 275
concentration plant, in Sierra Leone, 372
determination of alumina, 171
determination of aluminium, electrometric method, 170
determination of calcium, 396
determination of magnesium, 396
determination of manganese, persulphate method, 171
Lorraine, composition, 253
preparation, 253
reduction, by blast-furnace gas, 147
screening, 253
sintering, 145, 372
smelting, history in Britain, 398; in induction furnaces, 57
spathic, concentration, 145
Swedish, geochemistry, 253
titaniferous, use in blast-furnace, 148
vanadium content, 371
Iron Ore Deposits, Brazil, 371; Colombia, 371; France, 54; Labrador, 253, 371; Lorraine, 54; Poland, 371; Weser-Wiehen mountains, 54
Iron Ore Reserves, Mesabi, 253
Iron Oxide, reduction by carbon monoxide, 149; reduction as diffused-controlled reaction, 148; transformation, 170
Iron Oxide Systems, equilibrium, 151
Iron Percarbide, 392
Iron Powders. *See* Powders
Iron Sand, in New Zealand, 371
Iron Scale, structure, 168
Iron Silicide, heat of fusion, 270; structure, 167
Iron–Silicon–Carbon Alloys, equilibrium with methane–hydrogen mixtures, 165
Iron Sponge. *See* Sponge Iron

Iron and Steel Works, integrated, layout, 327 (*Paper*)
Iron–Tungsten Alloys, electrodeposition, 383
Ironing, metal cups, stress calculation, 41 (*Paper*), 379
Ironworks, medieval, 326
Isothermal Transformation Diagrams, 166
Isothermal Transformations, 78
Isotopes, radio-active, uses, 163

Japan, powder metallurgy, 384
Jet Test, for thickness measurement of coatings, 68
Jones and Laughlin Steel Corp., mixer cars used, 149; wire mills, 65, 260

Kilns, for refractory materials, 147
Koppers-Bruay Carbonization Process, 372

Laboratories, corrosion testing, 79; for study of moulding sand, 60
Labrador, iron ore deposits, 253, 371
Lacquer Coatings, anti-corrosive, 266; porosity measurement, 394
Lacquers, evaluation, 383
Ladle Hooks, design, 156
Ladles, hot-metal, 66, 149, 156; slag, 66
Lake City Malleable Inc., plant, 65, 257
Lamp Generator, for hardening and melting, 378
Laplace's Equation, in photoelasticity, 386
La Pointe Machine Tool Co., heat-treatment plant, 153
LAT System, for determining number and size of casting gates, 61
Lead, fretting corrosion, 169
Lead-Coated Steel, fretting corrosion, 169
Lead Coatings, thickness determination, jet test, 68
Lead–Tin Alloys, electrodeposition, 265
Levelling, sheets, 261
Lightning, protection in electric power stations, 155
Lime, for retarding corrosion of pipes, 78
Limestone, mining and preparation, 254
Lincolnshire, coal seams, 253
Linings,
  blast-furnace, materials for, 57; Russian standards, 147
  furnace, French materials, 57
  induction furnaces, 147
Liquo-Striction, 170
Loading Controller, for pig iron, 45
Locomotive Parts, fatigue, 386
Locomotives, Diesel, maintenance, 155
Lorraine, iron ore deposits, 54
Lorraine Coal, coking properties, 55
Lorraine Iron Ore, composition, 253
Lubricants, ageing, 66; barium, 262; for drawing, 66; for wire drawing, 260; surface activity, 262; synthetic, 66
Lubricating Equipment, maintenance, 262
Lubricating Systems, centralized, 262
Lubrication, bearings, 66; gears, 66; rolling mills, 380; strip mills, 262
Lurgi Gasification Process, 56
Luxemburg, uses of coke-oven gas, 254

Machinability,
  cast iron, 157
  free-cutting steel, 263
  steel, 381; relation to structure, 264
Machine Parts, production by powder metallurgy, 160
Machine Tools, use of nickel steel, 390
Machining, metals, 157; stainless steel, work-hardening, 157
Mackintosh-Hemphill Co., roll-making practice, 377
Magnefer, 56
Magnesia. *See* Refractory Materials
Magnesite Bricks. *See* Refractory Materials
Magnesium, determination in iron ore, 396; determination, polarometric titrations, 276; reactions in high vacuo, 170
Magnesium Alloys, deformation under longitudinal impact loads, 385; properties at low temperatures, 273
Magnesium Oxide, determination in dolomite, 275
Magnet Alloys, analysis, 171; properties, 270
Magnetic Analysis, 172
Magnetic Cores, resin bonding of silicon steel, 388
Magnetic Fields, effect on steel, transformations, 163
Magnetic Permeability, nickel–iron wire, 163
Magnetic Powder Tests, 73; use of coloured powders, 163
Magnetic Properties, wattmeter and bridge methods of testing, 73
Magnetic Properties of,
  carbon steel, 74
  chromium steel, 74
  manganese-arsenic alloys, 163
  manganese-nitrogen alloys, 163
  ores, 54
  silicon steel, effect of abrasion, 74
  tempered steel, relation to structure, 73
Magnetic Tests, steel, 162
Magnetism, theories, 387
Magnetite, genesis, 54
Magnetization, thin films, 387
Magnets,
  cast, moulding sand for, 60
  forging, 379
  permanent, from iron powder, 388; materials for, 387; stability, 387
Malleable Cast Iron,
  analysis, 396
  annealing, oxidizing power of ore mixtures, 22
  annealing rate, effect of manganese–sulphur ratio, 59
  blackheart, annealing, effect of aluminium, 152; annealing, effect of boron, 152; annealing, effect of chromium, 152; annealing, effect of manganese, 65; defects, 62; galvanizing brittleness, 73; manufacture in cupolas, 59
  effect of boron, 271
  hardness tests, 72
  manufacture, 376; in converters, 60
  properties, 75
  whiteheart, peeling, 17
Malleablizing Furnaces, 65, 259, 376; electric, 65, 257; oil-fired, 60
Management, organization, 174
Mandrels, for tube mills, 154
Manganese,
  behaviour in blast-furnace, 148
  combustion in molten iron, 256
  determination in iron ore, persulphate method, 171
  determination in magnet alloys, 171
  determination in ores, 171
  determination of permalloy, spectrographic method, 277
  determination in slag, 171
  determination in steel, 276, 277, 396; colorimetric method, 276; photoelectric method, 721
  effect in chromium steel, polymorphic transformations, 78
  effect in malleable cast iron, annealing, 65
  effect in steel, spheroidization, 153
Manganese-Arsenic Alloys, magnetic properties, 163
Manganese Compounds, determination in atmosphere, 172
Manganese – Molybdenum – Nickel – Silicon Steel, properties, 164
Manganese–Molybdenum Steel, determination of oxygen, 277; induction hardening, 153
Manganese-Nitrogen Alloys, magnetic properties, 163
Manganese Ores,
  analysis, spectrochemical methods, 275
  concentration, 253
  determination of manganese, potentiometric method, 276
  reduction, 257
Manganese Steel, diffusion of carbon, 164; forged, properties, 260; production in basic electric furnace, 374
Manganese–Sulphur Ratio, effect on annealing rate of malleable cast iron, 59
Manganese–Vanadium Steel, properties, 76
forged, properties, 260
Marshalite, 147
Martempering, 63
Martensite,
  formation in steel, effect of chromium, 166
  formation on wire rope, 270
  isothermal decomposition, 166
  transformation, cracking of steel, 73; effect of grain size, 166
Martensitic Steel, secondary hardening, 162
Maurer Diagram, 77
Mazières Furnace, 376
Melting Shops, railway systems for, 202
Mercury-Sealed Bulbs, for gas analysis, 398
Mesabi Range, iron ore reserves, 253
Mesle Test, for thickness determination of coatings, 382
Metal Cups, ironing, stress calculation, 41 (*Paper*)
Metal–Slag Equilibrium. *See* Slag–Metal
Metallic Solutions, liquid, activities, 150
Metallizing. *See* Spraying
Metallographic Specimens, levels of surfaces, 2; thin, preparation, 177 (*Paper*)
Metallography, colour, 165
Metallurgical Equilibria, graphical study, 150
Metallurgical Reactions, thermodynamics, 151
Metallurgy, physico-chemical principles, 150
Meteorites, composition, 54
Microburettes, capillary, 396
Microphotometer, 275
Microscopes,
  electron, 76; calibration, 165; for studying corrosion, 169; preparation of replicas, 165
  electron interference, 76
  film adaptor, 390
  high-temperature, 76
  phase-contrast incident-light, 1 (*Paper*)
  reflecting, 76
Microscopic Examination, stainless steel, 391
Microscopy, vacuum furnace for, 273
Microsections, paraffining, 165
Microstructure, interpretation, 77
Microtome, for preparing thin specimens, 177
Mild Steel, for ship construction, 273
Milk Pails, manufacture, 260
Mill Pinion, reclamation by welding, 157
Mining, limestone, 254; Salzgitter ores, 145
Mining Industries, Sweden, 174
Mining Machinery, breakage, 386
Miraival, 160
Mixer Cars, for molten iron, 149
Mixers, 149
Models, for demonstrating plastic deformation, 71; for metallurgical research, 256; for planning and designing, 174; for studying combustion processes, 372
Modulus of Elasticity, variation with temperature, 71
Molochite, 258
Molybdenum,
  determination, colorimetric method, 171; in ferro-molybdenum, 172; in malleable cast iron, 396; in permalloy, spectrographic method, 277; photometric method, 171; polarometric titrations, 276; thiocyanate method, 171
  effect in chromium–nickel steel, intergranular corrosion, 274

Molybdenum—*continued.*
effect in iron–nickel–carbon alloys, austenite transformation, 166
oxidation-reduction potential, 392
pyrolitic deposition, 159
Molybdenum Alloys, oxidation, 170
Molybdenum–Nickel Cast Iron, hardenability, 73; properties, 272
Molybdenum Steel,
carbides, 391
effect of aluminium, 273
effect of chromium, 273
effect of nickel, 273
effect of titanium, 273
effect of vanadium, 272, 273
forged, properties, 260
graphitization, 271; effect of zirconium, columbium and titanium, 389
properties, 389
Molybdenum–Tungsten Alloys, analysis, 171
Molybdenum–Vanadium Steel, effect of furnace practice, 273; graphitization, 271
Monel, corrosion by sulphates, 394; for pickling equipment, 157
Monmouth, medieval ironworks, 326
Mould Facings, 60
Mould Surfaces, action on molten steel, 60
Moulding, automatic, 152
Moulding of,
circular castings, use of strickles, 61
ingot moulds, 258
turbine casing, 152
Moulding Boxes, 152
Moulding Machines, 152
Moulding Sand,
analysis, 278
bentonite additions, 61
charcoal additions, 60
chemical coating, 258
clay-bearing, 60
clay-free, 60
compressibility, 60
drying, 152
French, 60
grain fineness, 60
grain size, 152
laboratory for studying, 60
natural bonded, *versus* synthetic sand, 258
preparation, 60
properties, 257
reclamation, 60
resin binders, 60, 61
synthetic, for cast magnets, 60
thermal conductivity, 60
Moulds,
core, for stainless steel castings, 60
ingot. *See* Ingot Moulds
knocking-out, 61
permanent, for iron castings, 152
temperature distribution, 61
Mullite. *See* Refractory Materials
Multimet, for chemical plant, 173

Nanaimo Coal Field, 54
National Physical Laboratory, corrosion research, 170; metallurgical research, 165
National Tube Co., stretch-reducing mill, 155
Newport News Shipbuilding and Dry Dock Co., photoelastic laboratory, 386
New Zealand, iron sand deposits, 371
Nichrome, determination of manganese, potentiometric method, 276
Nickel,
additions, to cast iron, 59
corrosion, by sulphates, 394
determination, with cobalt, electrometric titration, 276; photometric method, 171; polarometric titration, 276
determination in magnet alloys, 171
determination in permalloy, spectrographic method, 277
determination in steel, 277, 396; colorimetric method, 276; interference by cobalt, 277; photoelectric method, 172; polarographic method, 276
Nickel—*continued.*
effect in chromium nickel–steel, intergranular corrosion, 274
effect in iron–nickel–carbon alloys, austenite transformation, 166
effect in molybdenum steel, 273
electrodeposition, 69
Nickel Alloys, internal oxidation, 169
Nickel Cast Iron, non-magnetic, 152
Nickel Coatings, action of organic sulphonates, 265; heavy, 265; peeling, 69; properties, 265
Nickel Plating Baths, determination of cadmium, 265; impurities, 68, 69; sodium sulphate, 69
Nickel Steel,
austenite transformation, 167
corrosion, in sulphur dioxide, 395
damping capacity, 388
effect of heat treatment, 164
for gears, 164
for machine tools, 390
forged, properties, 260
impact strength, 164
properties, 164, 389; at low temperatures, 271, 273
thermal expansion, 164
Nimonic, drawing, 65
Niobium. *See* Columbium
Ni-Resist, corrosion by sulphates, 394; properties, 272
Ni-Tensyliron, properties, 272
Nitralising Treatment, steel, 264
Nitralloy, graphitic, properties, 273
Nitriding, carbo-, 64, 65; tool steel, 153
Nitrogen,
absorption in basic Bessemer process, oxide film theory, 149
behaviour in arc welding, 262
behaviour in electric furnace process, 375
determination, in iron and steel, 172
effect in chromium–nickel steel, intergranular corrosion, 274
effect in steel, galvanizing, 383
evolution, from iron-nitrogen alloys, 163
in basic Bessemer steel, 149
in converter steel, effect of blowing procedure, 255; effect of converter shape, 255
in pig iron, 148
in steel, effect of titanium, 389
Nitrogen Fertilisers Ltd., ammonia production, 373
Nodulite. *See* Cast Iron, nodular
Nomogram, for determination of hardness, 387
Non-Ferrous Metals, for chemical plant, 173
Norbury Diagram, 77
Norms, in analytical work, 395
Norway, standardization of iron and steel, 390
Notch Effect, transversely drilled torsion bars, 71; with fluctuating loads, 72
Notched Specimens, cutting, impact susceptibility, 264
Nottinghamshire, coal seams, 253
Nucleation, transient, 78
Nuts, cold punching, 260; forging, 260

Obituary Notices: C. Y. Clayton, 369; L. S. Davis, 369; G. T. Lunt, 369; T. W. Robinson, 369; G. R. Thompson, 369; F. de Wendel, 369
Octagons, rolling, 155
Oil, rust-preventing, 168
Oil Fuel, for forge furnaces, 377; for furnaces, 56; for malleablizing furnaces, 60; for open-hearth furnaces, 58, 301 (*Paper*)
Oil Refinery Equipment, corrosion, 274; materials for valves, 275; use of clad steel, 395
Open-Hearth Furnaces,
basic, design, 256
basic bricks, 147
bottoms, disintegration, 373; performance, 147
charging, 191 (*Paper*), 256; time studies, 206
Open-Hearth Furnaces—*continued.*
charging rate, effect of heat transfer, 212
compared to glass furnaces, 374
differential pressures, meter for measuring, 222 (*Paper*)
flame control, 58
flames, cinematography, 374
gas flow, 256
heat balance, 374
heat transfer, 256
heating, 149
hot metal from cupolas, 58, 149
instrumentation, 58
melting time, study with use of wax, 219
oil-fired, 58, 301 (*Paper*)
oxygen-enriched air, 58, 149, 256
radiation, 220
roof design, 149
silica bricks, for roofs, 56
slag sampling, 58
temperature measurement, 56
time required for heating and melting, 220
Open-Hearth Practice, oxygen for decarburization, 149
Open-Hearth Process,
acid, 58
basic, behaviour of oxygen, 149; direct oxidation, 149; sulphur removal, effect of sulphur in fuel gas, 58
function of slag, 374
sulphur distribution between metal and slag, 150, 374
Open-Hearth Slag, constitution, 151
Ore-Bridges, welded, 157
Ore-Dressing Laboratory, United Steel Companies, 145
Ore-Handling Plants, layout, 336
Ores,
crushing and screening, 371
determination, alumina, 171; iron, 171; manganese, 171; phosphorus, 171
flotation, 371
magnetic properties, 54
Salzgitter, mining, 145
Siderite, properties and uses, 253
transport, 145
Organic Coatings, 69; exposure tests, 68
Orsat Apparatus, for gas analysis, 398
Osbaston, medieval ironworks, 326
Otanmäki Ore, 371
Oxidation,
coal, 55
copper, 170
internal, alloys, 169
iron, 170
metals, 168
molybdenum alloys, 170
Oxidation-Reduction Potentials, iron and molybdenum, 392
Oxide Coatings, Thermoxyd process, 69
Oxide Film Theory, nitrogen absorption in basic Bessemer process, 149
Oxide Films, breakdown in acid vapours, 170; on alloy steels, 168
Oxide Layer, formation in steel bath, 256
Oxides, metallic, reduction by carbon monoxide, 148; thermodynamics, 150
Oxygen,
behaviour in arc welding, 262, 380
behaviour in basic open-hearth process, 149
determination, in chromium–nickel steel, 277; in iron and steel, 172; in liquid steel, aluminium-killed bomb method, 277; in manganese–molybdenum steel, 277
effect of iron, contact potential difference, 393
equilibria in steel, 58
for decarburization, in electric furnaces, 150; in open-hearth furnaces, 149
in electric furnace practice, 375
manufacture, 174, 278
passivation of iron, 393
reaction, with sulphur dioxide at steel surface, 393
Oxygen-Air Mixtures, 58
Oxygen-Enriched Air, for blast-furnaces, 148, 256; for converters, 58, 256, 377;

Oxygen-Enriched Air—*continued.*
for electric furnaces, 256; for open-hearth furnaces, 58, 149, 256; for side-blown converters, 150
Oxygen Equilibria, in steel, 58
Oxygen Plants, large-scale, 373

Packaging, metal parts for transport, 70
Packard Motor Co., forging practice, 260
Paint Coatings, shrinkage, 384
Painted Steel, corrosion, 394
Painting, galvanized steel, 266, 267; preparation of metals for, 67, 69, 159; structures, 266
Paints,
anti-corrosive, 267
anti-fouling, toxins in, 70
cementiferous, 100
corrosion-inhibiting primers, 70
Detel type, 160
for acid atmospheres, 160
for under-water service, rotor tests, 267
metal-pigment, 266
plastic, 266
properties, 384
protective value, 94
rust-preventive, 160
weathering tests, 266
Palm Oil, substitutes for, 380
Park Gate Iron and Steel Co., Ltd., oil-fired open-hearth furnaces, 301 (*Paper*)
Particle Size, classification, 60
Passivation, iron by oxygen, 393
Passivity, metals, 68
Patterns, foundry, purchase, 61
Peeling, nickel coatings, 69; whiteheart malleable cast iron, 17
Peening, 162, 381
shot, effect on corrosion-fatigue, 169; effect on fatigue, 72
Penetrascope, Warman, 269
Permalloy, analysis, spectrographic method, 277
Persulphate Method, for determination of manganese, 171
Petit Coke Oven, 55
Petroleum Industry, corrosion problems, 266
Phase-Contrast Method, for examination of phase changes, 3
Phases, constitution at high temperatures, 150
Phosphate Coatings, for drawing, 379
Phosphatizing, Antiox process, 159; automobile bodies, 383; metals, 69; sintered iron, 159
Phosphor Bronze, fretting corrosion, 169
Phosphorus,
determination, in ores, 171; in slag, 171; in steel, photoelectric method, 172; photometric method, 171
effect in cast iron, 271
Photocolorimetric Analysis, determination of inclusions, 277; determination of silicon, 276
Photoelastic Laboratory, Newport News Shipbuilding and Dry Dock Co., 386
Photoelasticity, 386; Laplace's equation, 386; three-dimensional, 385
Photoelectric Analysis, of gas, 172; of steel, 172
Photometric Analysis, 396; determination of chromium, 171; determination of molybdenum, 171; determination of nickel, 171; determination of phosphorus, 171
Photometric Methods, for investigation of surfaces, 76
Photomicrographs, hot metal surfaces, 76
Physico-Chemical Principles, process metallurgy, 150
Physics, of metals, 385
Pickling, hydrogen embrittlement of metals, 264, 271; inhibitors for, 382; relative merits of sulphuric acid and hydrochloric acid, 382
Pickling of,
pipes, 67
steel, 264
strip, 157, 382
wire, 382
Pickling Acids, effect of additions, 67
Pickling Equipment, Monel for, 157
Pickling Liquors, disposal, 158, 382
Pig Iron,
dephosphorization, 57
desiliconization, 148
desulphurization, 57, 377
gases in, 271
machine-cast, 152
nitrogen content, 148
sampling and analysis, 255
sorting, by thermoelectric apparatus, 398
synthetic, production in cupolas, 57
Pinions, hardness tests, 162
Pipes,
bituminous coating, 266
buried, cathodic protection, 79, 275, 394, 395; corrosion, 79, 168; measurement of galvanic currents, 169
chromium–molybdenum steel, properties, 272
corrosion, 275, 395; by bacteria, 394; retardation by lime, 78
graphitization, 271
internal pickling, 67
manufacture, 154
plastic coating, 383
welding, 263
Piston Rings, tests, 268
Pitting, gears, 270
Planing, cast iron, carbide tools for, 264
Plaster, permeable, for precision casting, 61
Plastic Flow, anisotropic sheet steel, 71
Plastic Deformation, theory, 379
Plastic Resistance, maximum, 71
Plasticity, models for demonstrating, 71; propagation under uniaxial compression, 72; stress-strain laws, 71
Plastics, for foundry patterns, 258
Plate Mills, 155; driving, 154
Plates,
boiler, corrosion, 392
heating-up, 63
mild steel, fracture, 161, 269, 386
ship, properties, 273
Plating, pyrolitic, metals, 159. *See also* Electrodeposition and Electroplating
Poland, iron ore deposits, 371
Polariscopes, 161
Polarization Phenomena, iron–nickel alloys, 74
Polarograph, visual, 387
Polarographic Analysis, 275, 395, 397; for determination of copper and nickel, 276; tapping of capillary tube, 397; use of solid electrodes, 397
Polarometric Titrations, 276
Poldi Hardness Tester, 72
Polished Metals, surface appearance, 391
Polishing,
barrel, 67, 68, 264
electrolytic, 68, 76, 157, 264, 382, 391; rapid method, 77; source of error in current/potential curve, 77
metallographic, 391
use of diamonds, 157
Polishing of,
chromium, 76
metal crystals, effect on straining, 77
metals, 68
stainless steel, 264
steel, 76
Pompey Steel Works, use of oxygen-enriched air, 256
"Porcelain Wallpaper," 160
Porosity, electrodeposited coatings, 383; iron coatings, 62; lacquer coatings, measurement, 394; metallic coatings, 158
Porosity Test, for tin coatings, 266
Potentiometric Method, for determination of manganese, 276
Pots, cast iron, for zinc melting, 377
Pouring Temperature, effect on ingots, 375
Powder Metallurgy, 160; developments, 267; for machine parts, 385; in Japan, 384
Powder Particles, cohesion, 160
Powders,
electrolytic iron, production, 384
iron, compacting, 267; for permanent magnets, 388; for production of
Powders—*continued.*
machine parts, 160; for welding electrodes, 262; pig-iron/scale process, 160; reduction, 255; sintering, 267, 385
metal, classification of particle size, 384; effect of surface structure of individual particles, 384; for friction materials, 267; moulding and sintering, 267; production, 267; sintering, 384; theory of diffusion, 385; theory of sintering, 267; volume changes, 267
Power, costs for steel plants, 80; generation, 155
Power Balance, integrated works, effect of coke-cooling plants, 114; steel plants, 254
Power Load, relation to steam and fuel balances, 254
Power Requirements, wire drawing, 154
Power Stations, emergency load control, 155; fuel economy, 55; lightning protection, 155
Precision Instruments, heat treatment, 64
Presses,
for refractory blocks, 147
forging, heavy, 378
Pressing, hot, 379; metals, 379; stainless steel, 260
Pressing Dies, setting, 260
Pressure Meter, for measuring differential pressures in open-hearth furnaces, 222 (*Paper*)
Pressure Tests, tubes, 71
Pressure Vessels, stainless steel for, 379; welding, 262
Producer Gas, cleaning, Whessoe plant, 56
Producer Practice, 56
Producers, gasification of coke, 56
Proof Stress, determination, 70
Propellers,
aircraft, heat treatment, 64; manufacture, 154
Pulverized Coal. *See* Coal, pulverized
Pumps,
boiler-feed, corrosion, 79
turbine, corrosion, 167
vacuum, corrosion of jets, 167; welding, 381
Punching, cold, nuts, 260
Pyrolitic Coatings, 159
Pyrometers,
optical, uses, 146; effect of smoke and atmospheric absorption, 146

Quality Control, castings, 257; statistical methods, 62, 158
Quantometer, 398
Quartz, vein, for dinas bricks, 147
Quartz Pelites, for dinas bricks, 57
Quartzite Gravels, for silica bricks, 147
Quenching, isothermal, 65; stepped, 63

Radiation, combustion products, 55; in open-hearth furnaces, 220
Radio Equipment, protective finishes, 265
Radio-Frequency Heating, 64, 378
Rail Mills, design, 154
Rails, transverse fissures, 386
Railway Materials, failure, 386
Railway System, layout for melting shop, 202
Ramsburg Co., spraying and detearing processes, 160
Ramset, 56
Rat Tail Defects, in castings, 62
Razor Blades, production, 264
Reactions,
gas–metal, study by reflection electron diffraction, 170; zone of metal phase consumption, 168
metallurgical, thermodynamics, 151
metals, in high vacuo, 170
reduction and roasting processes, 145
Reactivity, coke, 56
Recalescence, steel, 258
Recrystallization, theory, 391

Recuperation,
metallic, 145, 146
silicon-carbide, for slab furnaces, 377
Reduction,
iron, 149
iron ore, by blast-furnace gas, 147
iron oxide, by carbon monoxide, 149; as diffused-controlled reaction, 148
metallic oxides, by carbon monoxide, 148
Reduction Processes, reactions, 145
Reed Roller Bit Co. forging plant, 63
Refining, steel, critical point, 150
Refractory Industries, power requirements, 57
Refractory Materials,
determination of aluminium, electrometric method, 170
for foundries, 57
Indian, petrography, 147; properties, 147
kilns for, 147
manufacture, 56
presses for, 147
Refractory Materials (Acid), unfired, 147
Refractory Materials (Alumina), properties, 373
Refractory Materials (Alumina Bricks), manufacture, 146
Refractory Materials (Basic Bricks), for open-hearth furnaces, 147; manufacture, 373
Refractory Materials (Beryllia), properties, 373
Refractory Materials (Carbon), for blast-furnaces, 147
Refractory Materials (Chrome), plastic, 147
Refractory Materials (Dinas Bricks), use of quartz pelites, 57; use of vein quartz, 147
Refractory Materials (Dolomite), analysis, 275; dead-burned, 254; preparation, 56
Refractory Materials (Firebricks), effect of reheating, 57
Refractory Materials (Magnesia), properties, 373
Refractory Materials (Magnesite Bricks), sintering, 57
Refractory Materials (Mullite), properties, 373
Refractory Materials (Silica Bricks) for open-hearth roofs, 56; manufacture, 147; service performance, 147; use of quartzite gravels, 147
Refractory Materials (Silicon Carbide), properties, 373
Retractory Materials (Thoria), properties, 373
Refractory Materials (Zirconal), properties, 57
Refractory Materials (Zirconia), properties, 373
Regulators, temperature, 146, 254
Reheating Furnaces,
for billets, 63, 258
for forgings, 258; oil-fired, 377
for sheets, 258
for slabs, 258; recuperative, 377
heating rates, 254
Relaxation, cold, of wire, 389
Republic Steel Corporation, rolling-mill plant, 155; sheet mills, 261; strip mills, 261
Research, applied, in Russia, 174; metallurgical, use of models, 256; technical trends, 255
Resin, coking, 55
Resin Binders, for cores, 152; for moulding sand, 60, 61
Resistance, electrical. *See* Electrical Resistance; plastic, maximum, 71
Risers, for castings, dimensioning, 61
Riveting, stainless steel, 381
Rivets, forging, 65
Roasting Processes, reactions, 145
Roberts Carbonization Process, 372
Rock-Drilling, 145
Rockwell Hardness Tester, checking performance, 387
Rod Mills, design, 155; speed control, 261
Rods, decarburized, carbon restoration, 153; reinforcing, strain measurement, 386
Roll Necks, oil seals, 261
Roll Passes, design, 261
Roll-Threading, bolts, 260
Rolled Steel, planning production, 380
Roller Chain, testing, 161
Rolling,
coefficient of friction, 71
cold, effect of speed, 380; terms and theories used, 380
deformation of materials, 71, 380
flow of metals, 379
stresses in, 154
Rolling of,
angles, 155
bars, spread of material, 380
hexagons, 155
octagons, 155
rounds, 155
sheets, 155
stainless steel sheets, 261
strip, 155, 261
Rolling-Mill Motors, adjustable speed drives, 154; control, 154; heating, 154; plugging methods, 156; speed stability, 261; standards, 154
Rolling Mill Plant, layout, 327
Rolling Mill Plants, Appleby-Frodingham Steel Co., 261; Broken Hill Proprietary Co., 373; Carnegie-Illinois Steel Corp., 155; Columbia Steel Co., 159, 261, 380; National Tube Co., 155; Republic Steel Corp., 155, 261; Steel Co. of Canada Ltd., 155; Washington Steel Corp., 155; Weirton Steel Co., 155
Rolling-Mill Tables, motor-driven, 380
Rolling Mills,
continuous, speed stability, 261
driving, systems, 260; twin-motor, 261
lubrication, 380
plate, 155; driving, 154
rail, design, 154
rod, design, 155; speed control, 261
section, 261
sheet, 380; driving, 261
slab, driving, 154
strip, 155, 261; driving, 154; electrical control, 155; electrical equipment, 154; hydraulic drives, 154; lubrication, 262, 380; Sendzimir, 154, 155, 261; tension measurement, 261; Unitemper, 261; **Y** type, 380
structural, design, 154
Rolling Stock, for iron and steel works, 66
Rolls, calibration, 154; design for rod mills, 155; forging, 379; manufacture, 59, 377; strain measurement, 261; turning, carbide tools for, 263
Ropes, winding, breakage, 387
Roughness, evaluation by flat section technique, 264
Rounds, rolling, 155
Russia. *See* Soviet Union
Rust, formation on iron, 274
Rust-Preventive Compounds, 159

S-Curves, 258
Safety Precautions, in plants, 278
Salt Baths, electrode, 378; for heat treatment, 63, 258, 259; hardening of cylinder liners, 64
Salzgitter Ores, mining, 145
Sampling, coke, 146; molten steel, 376; slag in open-hearth furnaces, 58
Sandslingers, 258
Scaffolds, blast-furnace, 295 (*Paper*)
Scale, chemical removal, 255; formation, 168; iron, structure, 168
Scale Cars, 66
Schrot Carbonization Process, 373
Schwarz and Vath Diagram, 77
Scotland, limestone mining, 254
Scrap, consumption in Europe, 398; removal of coatings, 399; sources, 58; supply for electric furnace practice, 375
Scrap Industry, Sweden, 79
Scrap Market, American, 375
Scratching, metals, 157
Screening, iron ore, 253; ore, 371, 372
Sea Water, corrosion of steel, 79, 393; corrosion-fatigue of steel under asymmetric stress, 11 (*Paper*)
Section Mills, 261
Segregation,
in ingots, 374; Dornin process for removal, 375
Selenium, determination in steel, gravimetric method, 171
Sendzimir Strip Mill, 154, 155, 261
Sewage Works, corrosion of metals, 394
Shafts, critical speed, 156; welding to castings, 67; worm, casting, 61
Shale, electrical resistance, 55
Sheet Furnaces, 258
Sheet Mills, 380; driving, 261
Sheet Steel,
anisotropic, plastic flow, 71
electrical, properties, 387
Sheets,
annealing, 154
corrugation, 154
deep-drawing 379; German specification, 273
hardness tester, 269
heat treatment, 153
levelling, 261
rolling, 155
silicon steel, annealing furnaces, 65
stainless steel, rolling, 261; welding, 262
thickness measurement, 155
Shelton Iron and Steel Co., blast-furnace scaffolds, 300
Ship Construction, use of mild steel, 273
Ship Plates, cold phosphatizing, 159; fracture, 161
Ships, anti-fouling compositions, 98; fouling, 384; fouling samples, examination, 35 (*Paper*)
Shot Blasting, 258, 381
Shot Peening, 162, 381; effect on steel, corrosion-fatigue, 169
Shrinkage Stresses, in welded joints, 263, 381
Siderite Ores, properties and uses, 253
Sierra Leone, ore concentration plant, 372
Sigma Phase,
alloy steel, effect of delta ferrite formation, 392
iron–chromium system, alloys isomorphous with, 78
Silchrome, grain size, 81
Silicate Inclusions, in basic electric steel, 59
Silica Bricks. *See* Refractory Materials
Silica Melts, electrical conductivity, 151; thermodynamic activity, 151
Silicic Acid, effect on slag–metal equilibrium, 256
Silicon,
combustion in molten iron, 256
determination in cast iron, photocolorimetric method, 276
determination in ferro-silicon, 172
determination in magnet alloys, 171
determination in malleable cast iron, 396
determination in permalloy, spectrographic method, 277
determination in steel, 276; photoelectric method, 172
effect in steel, spheroidization, 153
Silicon Carbide. *See* Refractory Materials
Silicon Cast Iron, properties, 271; properties at high temperatures, 389
Silicon Meter, for electrical steel sheets, 171
Silicon Steel, diffusion of carbon, 164; magnetic properties, effect of abrasion, 74; resin-bonded, for magnetic cores, 388
Silicon-Steel Sheets, annealing furnaces, 65
Silver Alloys, internal oxidation, 169
Simultan Deep-Drawing Process, 379
Sintered Iron, phosphatizing, 159
Sintering, iron ore, 145, 372; magnesite bricks, 57; metal powders, 267, 384
Slab Heating Furnaces, 258, 377
Slab Mills, driving, 154
Slag,
basic open-hearth, microscopic examination, 374
basicity, estimation, 151

Slag—*continued.*
blast-furnace, effect of heating on grindability, 57
control, 373; in acid electric furnace practice, 59
determination of alumina, 171
determination of iron, 171
determination of manganese, 171
determination of phosphorus, 171
ferro-chromium, mineralogy, 376
function in open-hearth process, 374
liquid, constitution and thermodynamics, 150
open-hearth, constitution, 151
oxidizing, composition, 374
recovery of vanadium, 57
sampling in open-hearth furnace, 58
Slag Ladles, 66
Slag–Metal Equilibrium, 151; effect of silicic acid, 256
Slag Wool, manufacture, 57
Sludge, chemical removal, 255
Smelting, iron ore, in induction furnaces, 57
Soaking Pits, 377
Soda Ash, for desulphurization of cast iron, 152
Sodium, determination in clay, 278
Sodium-Chlorite Liquors, corrosion of metals, 394
Sodium-Hydride Process, for descaling metals, 67, 157
Soldering, stainless steel, 260, 381
Solid Solutions, interstitial, 163
Solidification, cast iron, 62; ingots, 374; steel castings, 153; steel spheres, 62
Solubility, iron in hydrochloric acid, effect of surface condition, 393
Solutions, liquid metallic, activities, 150
Sorting, wire, thermoelectric method, 162
Soviet Union, applied research, 174; standards for blast-furnace linings, 147; types of steels produced, 273
Spark Tests, 172, 395
Spathic Ore, concentration, 145
Specific Heat, iron, high-purity, 87
Specifications, welding electrodes, American, 156
Spectrographic Analysis, 275, 395, 397
cast iron, 276
determination of chromium in ferro-chromium, 172
foundry materials, 171
permalloy, 277
Spectroscope, for grading stainless steel, 397
Spectroscopy, constant spark conditions, 275; magnetic stabilizer for D.C. arcs, 275; sparking-off effect in steel, 172; use of vibration-interrupted arc, 172
Speculum Metal, electrodeposition, 265
Spheroidization, steel, 153
Spindles, automobile, forging, 65
Spinning, stainless steel, 65, 260
Sponge Iron, manufacture, 149, 255
Sprayed Metals, properties, 159
Spraying, enamel, 94; metals, 69, 70, 160, 384
Spraying Pistols, 159
Spring Steel, fatigue, effect of surface defects, 162
Springs,
design and manufacture, 174, 390
fatigue, effect of shot peening, 72
spiral, induction heating, 153
Stability, dimensional, tool steel, 166
Stabilization, chromium–nickel steel, 392; effect on austenite transformation, 166; undercooled austenite, 273
Stainless Clad Steel, uses, 173
Stainless Steel,
annealing furnaces, 65
barrel polishing, 264
corrosion, by fluids of human body, 395; by hot gases, 395
deep drawing, 260
discovery, 173
drawing, 65
electrolytic polishing, 264
flame cutting, 157, 381
for chemical and food industries, 79, 173
Stainless Steel—*continued.*
for pressure vessels, 379
grading, by spectroscope, 397
heat treatment, 153, 378, 390; in salt baths, 259
intergranular corrosion, 79; effect of titanium and columbium, 78
mechanical treatment, 379
microscopic examination, 391
precision casting, 152, 377
pressing, 260
properties, 164
riveting, 381
soldering, 260, 381
spinning, 65, 260
surface finish, 67, 378
welding, 156, 260, 381
work-hardening, during machining, 157
Stainless Steel Castings, use of core moulds, 60
Stainless Steel Pipes, manufacture, 154
Stainless Steel Sheets, rolling, 261; welding, 262
Stainless " W " Nickel Steel, properties at low temperatures, 273
Stamping, flow of metals, 379
Standardization, iron and steel in Norway, 390; tool steel in Sweden, 390
Standards, for rolling mill motors, 154
Statistical Department, in steel plant, 174
Statistical Methods, in industry, 174; quality control, 62, 158
Statistical Rate Theory, 71
Steam, emissivity, 55; high-pressure, for steel mills, 155
Steam Balance, relation to power load, 254; steel plants, 254
Steel,
acid-resistant, intergranular corrosion tests, 167
action of sulphuric acid, effect of inhibitors, 169
alloy, carbide structure, 273; carbides, 391; corrosion in industrial atmospheres, 393; corrosion in sea-water, 79; decarburization with mill scale, 377; effect of titanium, 389; for industry, 75; hardenability, 64; hardness, effect of complex tempering cycles, 154; history, 173; inclusions, 151; oxide films, 168; properties, 272; properties at low temperatures, 273; sigma phase, effect of delta ferrite formation, 392; structural stability at high temperatures, 273
annealing, isothermal, 153
austenitic, properties at high temperatures, 74
automobile, hardenability bands, 162
Bessemer. *See* Bessemer Steel
brittleness, under tensile stress, 70
carburization, sulphide penetration, 17
casting, centrifugal, 62, 152
catalytic oxidation of sulphur dioxide, 393
cleavage fractures, 72
corrosion, by ammonium sulphate, 395; by fluorine, 274; by sulphates, 394; in gas-condensate fluids, 168; in hydrochloric acid, 394; in sea water, 393; in sulphuric acid, 394
corrosion-fatigue, effect of shot peening, 169; under asymmetric stress in sea-water, 11 (*Paper*)
corrosion-resistant, for textile industry, 76
cracking, during martensite transformation, 73
decarburization, 259
defects, detection, 70
deformation under longitudinal impact loads, 385
diffusion of carbon, 259
effect of chromium, martensite formation, 166
effect of cold work, spheroidization, 153
electric. *See* Electric Steel
electrical sheet, silicon meter for, 171
electrolytic polishing, 76
fatigue, effect of surface-active substances, 386
flake formation, 73
Steel—*continued.*
for automobile parts, 390
for forging, 260
forged, properties, 260
free-cutting, machinability, 263; properties, 390
fretting corrosion, 169
gases in, 62
graphitization, 271
grinding, 264
hardenability, 153, 270; effect of boron, 75
hardness, effect of elements, 270
heat-resistant, heat treatment, 153
heat treatment, effect of alloying elements, 63
hydrogen evolution, during electroplating, 271
impact tests, under compression, 161
inclusions, distribution, 278; elimination, 376; isolation, 77
induction hardening, 153
lead-coated, fretting corrosion, 169
liquid, determination of gases, 278; determination of oxygen, 277; sampling, 376; temperature measurement, 56
low-carbon, welding, sulphur reactions and hot cracking, 262
machinability, 381; relation to structure, 264
magnetic tests, 162
manufacture, in arc furnaces, 256
mild, drawing, 65
modulus of elasticity, variation with temperature, 71
nitrogen content, effect of converter blowing procedure, 255; effect of converter shape, 255; effect of titanium, 389
open-hearth. *See* Open-Hearth Steel
painted, corrosion, 394
properties, at high temperatures, 389 at low temperatures, 75
recalescence, 258
refined, critical point, 150
rolled, planning production, 380
separation, of sulphides, 276
spark tests, 172
spheroidization, 153
tempered, magnetic properties, relation to structure, 73
transformation, during induction heating, 64; effect of magnetic fields, 163
transverse structure, 151
weldability, 263
world production, 398
wrought, transverse strength, 268
zinc-coated, corrosion in hot water, 169
Steel Co. of Canada, strip mills 155
Steel Co. of Wales, controller for loading pig iron into wagons, 45; plant, 255
Steel Industries. *See* Iron Industries
Steel Plant, costing system, 79; layout, 327; maintenance by welding, 263; power costs, 80; welded buildings, Vierendeel type, 66; work of statistical department, 174
Steel Plants, Appleby-Frodingham Steel Co., 373; Broken Hill Proprietary Co., 373; Carnegie-Illinois Steel Corp., 255; Steel Company of Wales, 255
Steel Spheres, solidification, 62
Steetley Co., Ltd., plant, 254
Stellite, investment casting, 377
Stewarts & Lloyds, Ltd., gas control system, 146; slag control, 373
Stoves. *See* Blast Furnace Stoves
Strain, calculation in drawing, 379
Strain Ageing, welded structural steel, 263
Strain Gauges, 72, 261, 386
Strain-Hardening, metals, 162
Straining, metal crystals, effect of polishing, 77
Strength, calculation, 268; new theory, 268
Stress,
asymmetric, corrosion-fatigue of steel in sea water, 11 (*Paper*)
biaxial, tests of tubes, 71

Stress—*continued.*
measurement, 70, 72; amplifier for, 386; by Equilateral Fleximeter, 386; X-rays, 163, 271
Stress-Corrosion Cracking, chromium–molybdenum–nickel steel, 168
Stress-Relief, welds, 65, 263
Stress-Strain Curves, determination by two-load method, 161
Stress-Strain Laws, of plasticity, 71
Stress-Strain Relations, for elastoplastic deformation, 71
Stresses,
in **ironing of metal cups,** 41 (*Paper*)
in rolling, 154
internal, 161; effect on hardness, 387
residual, 386; in castings, 72; in chromium–nickel steel, 272; in hollow cylinders, 269; in welds, 156, 263
shrinkage, in welds, 381
Strickles, for moulding circular castings, 61
Strip,
aluminium-coated, 159
annealing, 154
electric heating, 63
electrolytic tinning, 69, 266
flowing of tin coatings, 63
galvanizing, 159
pickling, 157, 382
rolling, 155, 261
Strip Mills, 155, 261
driving, 154
electrical control, 155
electrical equipment, 154
hydraulic drives, 154
lubrication, 262, 380
Sendzimir, 154, 155, 261
tension measurement, 261
Unitemper, 261
Y type, 380
Structural Mills, design, 154
Structural Stability, alloy steel at high temperature, 273
Structural Steel, properties, 273; welded, strain-ageing, 263
Structure,
banded, carbon steel, effect of composition and working, 65
carbides in alloy steel, 273
carbon steel, 165
chromium coatings, 265
crystal, X-ray study, 165
dendritic, in cast steel, 77
grain, of solidifying metals, 391
ingots, 151
iron-nitride, 392
iron scale, 168
iron-silicide, 167
metals for turbines, 77
steel, relation to machinability, 264
tempered steel, relation to magnetic properties, 73
transverse, steel, 151
Sulphates, corrosion of metals, 394
Sulphide Penetration, during carburization of steel, 17
Sulphides, separation in carbon steel, 276
Sulphitation, effect in corrosion of tubes, 168
Sulphonates, organic, action on nickel coatings, 265
Sulphur,
activity, in liquid iron, 148
combustion, in molten iron, 256
determination, 396; in coal, 173, 278
distribution, between metal and slag, 150, 374
removal, in basic open-hearth process, effect of sulphur in fuel gas, 58; in blast-furnace, 148; in steelmaking, 150
Sulphur Dioxide, corrosion of metals, 395; corrosion of steel, 393; reaction with oxygen at steel surface, 393
Sulphur–Manganese Ratio, effect on annealing rate of malleable cast iron, 59
Sulphuric Acid, action on steel, effect of inhibitors, 169; corrosion of steel, 394
Supersonic-Radiographic Inspection, welds, 270
Supersonic Tests, 74, 388; welds, 270
Supersonic Waves, in metals, propagation, 74
Surface-Active Substances, effect on fatigue of steel, 386
Surface Finish, 156; control, 381; stainless steel, 67, 378
Surface Preparation, semi-finished steel, 157; tool steel, 157
Surface Reactions, metals, 168
Surface Treatment, selection of process, 381
Surfaces,
discontinuity, in fields of stress, 72
hot, photomicrographs, 76
metallic, properties, 169; study of low-temperature gas absorption, 169
photometric investigation, 76
Sussex, early ironworking at Ticehurst, 16 (*Paper*)
Sweden, export trade, 79; metal industry, 371; mining industry, 174; scrap industry, 79; standardization of tool steel, 390
Swedish Iron Ore, geochemistry, 253
Switzerland, electric furnace developments, 256
Syndolag, 56

Tanganyika Territory, coal deposits, 253
Tanks, water, cathodic protection, 274, 393, 395
Tantalum, determination of ferro-tantalum, 172
Tapholes, plugging device, 376
Tears, hot, in steel castings, 258, 377
Temperatures,
control, gas-fired furnaces, 254; use of bimetals, 146
distribution in moulds, 61
effect on weld metal, impact strength, 263
high, measurement of viscosity, 386; properties of chromium–molybdenum–nickel steel, 389; properties of chromium–nickel steel, 74, 389; properties of chromium steel, 389; properties of metals, 388; properties of nonferrous alloys, 389; properties of silicon cast iron, 389; propertes of steel, 389; structural stability of alloy steel, 273
low, properties of aircraft materials, 273; properties of alloy steel, 273; properties of aluminium, 273; properties of aluminium alloys, 273; properties of aluminium–bronze, 273; properties of chromium–nickel steel, 273; properties of magnesium alloys, 273; properties of nickel steel, 271, 273; properties of steel, 75; treatment of metals, 153; treatment of tool steel, 259
measurement, 146; liquid steel, 56; in open-hearth furnaces, 56
pouring, effect on ingots, 375
regulation, 146, 254
Tempered Steel, magnetic properties, relation to structure, 73; secondary hardening, 162
Tempering, bright, precision instruments, 64
Tempering Cycles, complex, effect on hardness of alloy steel, 154
Tensile Properties, aircraft materials at low temperatures, 273
Tensile Test Pieces, geometry and size, 72; ring-shaped, 70
Tensile Testing Machines, 385
Tensile Tests,
determination of proof stress, 70
effect of specimen shape on elongation, 161
impact, measurement of forces, 72; piezoelectric recording of tension, 70
two-load method of determining stress-strain curves, 161
Tensile Tests of, cast iron, effect of shape of test piece and speed of testing, 70
Tensions, interfacial, measurement, 166
Test Pieces,
tensile, geometry and size, 72; ring-shaped, 70
Testing Machines,
ballistic, 385
fatigue, for high temperatures, 162
hardness, Ebosa, 72; for sheets, 269; Poldi, 72; Rockwell, checking performance, 387; semi-micro, 76; Warman Penetrascope, 269
horizontal, 268
tensile, 385
universal, 385
Tests,
bend, 156, 263, 385; determination of yield point, 268; peripherally supported discs, 268; upper yield point, 385
compression, 71
corrosion, 78, 91; accelerated atmospheric, 167; long-term compared with laboratory, 78
end-quench, 269; action of water jet, 73
fatigue, symbols and nomenclature, 386
hardness, 72, 73, 162
impact, 161; speed of deformation, 385
impact-tensile, measurement of forces, 72; piezoelectric recording of tension, 70
magnetic, 162
magnetic powder, 73; use of coloured powders, 163
magnetic sorting bridge, 73
nondestructive, 70
salt spray, bibliography, 395
spark, 172, 395
supersonic, 74, 270, 388
tensile, 70; determination of proof stress, 70; effect of specimen shape on elongation, 161; two-load method of determining stress-strain curves, 161
torsion, determination of yield point, 268; dynamometer for, 161; use of bent specimens, 161
wear, 158
weldability, 385
Tests of,
bead welds, effect of electrode quality and welding skill on results, 156
butt welds, effect of sheet thickness, 263
brittle materials, 385
cast iron, 75; effect of shape of test piece and speed of testing, 70; preparation of specimen, 71
chromium coatings, 158
malleable cast iron, 72
organic coatings, 68
paints, 266
pinions, 162
piston rings, 268
protective coatings, 78
roller chain, 161
tubes, 71
turbine wheels, 271
Textile Industry, use of corrosion-resistant steel, 76
Thermal Conductivity, moulding sand, 60
Thermal Expansion, nickel steel, 164
Thermocouples, uses, 146
Thermodynamic Activity, silica melts, 151
Thermodynamics, liquid slags, 150; metallurgical reactions, 151; oxides, 150
Thermoelectric Apparatus, for sorting pig iron, 398
Thermoelectric Power, metals, 270, 387
Thermoplastic After-effect, in metals, 161
Thermoxyd Process, 69
Thickness Measurement, electrodeposited coatings, 158, 382, 383; lead coatings, 68; sheets, 155; tin coatings, Bendix method, 382
Thiocyanate Method, for determination of molybdenum, 171
Thoria. *See* Refractory Materials
Ticehurst, early ironworking, 16 (*Paper*)
Time Studies, foundries, 80; heat-treating operations, 259; open-hearth charging, 206

Tin, electrodeposition, 266; fretting corrosion, 169
Tin Coatings, chemical stability, 266; flowing, 63, 69, 159; thickness measurements, Bendix Method, 118 (*Paper*), 382; thiocyanate porosity test, 266
Tinning,
electrolytic, 69, 159; Ferrostan process, 69; Halogen process, 69
Tinning of, cast iron, 159, 383
Tinplate, defects, 266; manufacture, 159
Titaniferous Iron Ore, use in blast furnace, 148
Titanium,
determination in magnet alloys, 171
effect in aluminium–chromium–silicon steel, 389
effect in molybdenum steel, 273; graphitization, 389
effect in stainless steel, intergranular corrosion, 78
effect in steel, galvanizing, 383; nitrogen content, 389
Titanium Ore Deposits, France, 54
Tool Steel, American trade names, 76; developments, 390; dimensional stability, 166; for cold forging, 65; for die inserts, 65; for marking dies, 263; heat treatment, 378; low-temperature treatment, 259; selection 76; standardization in Sweden, 390; surface treatment, 153, 157
Tools, carbide, for roll turning, 263; electrolizing, 266; welding, 67
Torsion Bars, transversely drilled, notch effect, 71
Torsion Tests, determination of yield point, 268; dynamometer for, 161; use of bent specimens, 161
Transfer Cars, 66
Transformation Diagrams, isothermal, 78, 166
Transformations,
austenite, 166; atomic displacements, 167; effect of stabilization, 166; in iron–nickel–carbon alloys, effect of nickel and molybdenum, 166; in nickel steel, 167
in ferrous oxide, 170
in iron, 78
in steel, during induction heating, 64; effect of magnetic fields, 163
isothermal, 65, 78
martensite, cracking of steel, 73; effect of grain size, 166
polymorphic, of chromium steel, effect of manganese, 78
Transport, ore, 145
Transverse Strength, wrought steel, 268
Trichlorethylene, properties, 67
Tube Drawing, phosphate coatings for, 379
Tube Mills, mandrels for, 154; seamless, stretch-reducing, 155
Tube Steel,
banded structure, effect of composition and working, 65
manufacture, in acid Bessemer converters, 256; slag control, 373
Tube Steel Ingots, effect of pouring temperature, mould thickness and cooling rate, 375
Tubes, cold-drawing, 379; graphitization, 73; hydraulic, corrosion, effect of sulphitation, 168; internal pressure tests, 71; tests under biaxial stresses, 71; welding, 156
Tungsten, determination in iron and steel, 171; pyrolitic deposition, 159; reactions in high vacuo, 170
Tungsten Alloys, electrodeposition, 266
Tungsten Steel, effect of columbium, 273; for tube mill mandrels, 154
Turbine Casing, moulding, 152
Turbine Engine Parts, drawing, 65
Turbine Pumps, corrosion, 167
Turbine Wheels, tests, 271
Turbines,
gas, use of creep resistant alloys, 271
hydro, iron castings for, 272,
materials for, 272
structure of metals used, 77
Turkey, sludge clearance by dredger at steel plant, 399
Turning, rolls, carbide tools for, 263
Turnings, iron, for manufacture of cast iron, 59; steel, fusion into blocks, 373
Tuyeres, cupola, dimension and shape, 59
Twisting, small samples, 71

Uhlitzsch and Weichelt Diagram, 77
Uni-Temper Strip Mills, 261
United States, coke-oven capacity, 146; consumption of alloying elements 75; corrosion research, 78; early foundry industry, 398; forging practice compared with British, 234; iron ore reserves of Mesabi, 253; mould facing materials, 60; scrap market, 375; scrap supply for electric furnaces, 375; training of foundrymen, 174
United Steel Companies, Ltd., ore-dressing laboratory, 145
Uranium, determination in iron and steel, semi-microchemical method, 171

Vacuum, reactions of metals, 170
Vacuum Furnaces, control, 56; for high-temperature microscopy, 273
Vacuum Fusion Method for determination of gases in cast iron, 172
Vacuum Metallurgy, 174
Vacuum Pumps, corrosion of jets, 167; welding, 381
Valve Steel, grain growth, 318 (*Paper*); grain size, 81 (*Paper*)
Valves, for oil refineries, 275
Van der Horst Process, 265
Vanadium, effect in molybdenum steel, 272, 273; in iron ore, 371; recovery from slag, 57
Vancouver Island, coal deposits, 54
Varnishes, drying by induction heating, 266
Ventilation, wire mills, 260
Vierendeel Welded Structures, 66
Virgo Process. *See* Efco-Virgo Process
Viscosity, measurement at high temperatures, 386
Volume Changes, in metal compacts, 267
Volumetric Methods, of analysis, 395

Ward-Leonard System, 260
Warman Penetrascope, 269
Warrington, wire drawing practice, 260
Washington Steel Corp., strip mills, 155
Waste Heat, recovery from coke cooling plants, 104
Water, control of purity, 175; hot, corrosion of zinc and zinc-coated steel, 169; in French steel plants 399,
Water Pipelines, thawing out by welding equipment, 399
Water Softeners, 399
Water Supply Systems, corrosion, 395
Waterbury-Farrel Machine, for roll-threading bolts, 260
Wax, for studying melting time in open-hearth furnaces, 219
Wealden Iron Industry, 173
Wear, measurement, 270; metals, 73; wire ropes, 387
Wear Tests, chromium coatings, 158
Weathering Tests, paints, 266
Weirton Steel Co., strip mills, 155
Weld Metal,
composition, effect on strength of chromium–nickel steel, 381; effect on weld strength, 263
impact strength, effect of temperature, 263
Weldability, alloys for high temperature service, 66; steel, 263
Weldability Tests, 385
Welded Coatings, wear resistance, 156
Welded Joints, design calculations, 380; dimensioning, 66; shrinkage stresses, 263
Welded Structures, materials for, 66; Vierendeel type, 66
Welding,
arc, behaviour of oxygen, 380; behaviour of oxygen and nitrogen, 262; temperatures, 66
argon-arc, 262
automatic, 157, 262
bronze, 67
effect on hard-facings, abrasion-resistance, 67
electric resistance, 156, 381; metallurgy, 262
fusion, for hard-facing, 67; metallurgical aspects, 66
heat-resistant steel, 156, 262
Heliarc, 156; characteristics of arc, 66
shielded-arc, 156
spot, 66, 262
submerged-arc, 381
thermit, 67
Welding of,
acid-resistant steel, 262
automobile axles, 66
automobile parts, 66
cast iron, 67; electrode coatings for, 262
castings, 67, 157, 381
chromium–nickel steel armour plate, 156
corrosion-resistant steel, 262
low-carbon steel, sulphur reactions and hot cracking 262
mild steel, 66; effect of electrode quality, 262
mill pinions, 157
pipes, 263
pressure vessels, 262
pulverizing hammers, 157
shafts to castings, 67
stainless steel, 156, 260, 381
stainless steel sheets, 262
steel for enamelling, 263
steel-plant equipment, 263
tools and dies, 67
tubes, 156
vacuum pump, 381
Welding Electrodes,
coatings, for welding cast iron, 262; plasticity, 262
overheating, 156
powdered-iron, 262
quality, effect on welding mild steel, 262
specifications, American, 156
testing, 380
Welding Manipulators, uses, 381
Welding Rods, development, 262; materials for, 156
Welds,
bead, bend tests, effect of electrode quality and welding skill on results, 156
butt, bend tests, effect of sheet thickness, 263
diffusion of carbon, 164
fatigue, 381
residual stresses, 156
shrinkage stresses, 381
stress-relief, 65, 263
supersonic-radiographic inspection, 270
supersonic tests, 270
Wellingborough Iron Co., blast-furnace scaffolds, 296
Weser-Wiehen Mountains, iron ore deposits, 54
Westonite, 258
Wetting, effect on strength of metals, 170
Wheels, chilled improvement, 60
Whessoe Gas Cleaning Plant, 56
Williams Continuous Casting Process, 151
Winding Ropes, breakage, 387
Wire,
annealing furnaces, 65
atmospheric corrosion, 167
cleaning, 67
creep, 74
creep and cold relaxation, 389
decarburized, carbon restoration, 153

Wire—*continued.*
high-carbon steel, production, 260
iron, degasification, 67
nickel-iron, magnetic permeability, 163
pickling, 382
sorting, thermoelectric method, 162
Wire Cables, endurance, 76
Wire Drawing, 65, 260
coatings for, 260
deformation of material, 380
dies, carbide, 260; diamond, 65; gauge for, 380; shape, 260
in Warrington, 260
lubricants for, 260
phosphate coatings for, 379
power requirements, 154
use of Banox compound, 260
Wire-Drawing Machinery, history, 379; electric control, 260; tension control, 260
Wire Mills, fumes and ventilation, 260; Jones and Laughlin Steel Corp., 65
Wire Rope, martensite formation, 270; wear, 387
Wirtz Apparatus, for determination of carbon, 397
Wisner Carbonization Process, 372
Work Hardening, law, 72; stainless steel during machining, 157
Worm Shafts, casting, 61
Wrought Iron, determination of graphite, 76

X-Ray Camera, for precision measurement of crystals, 391
X-Ray Crystallography, back reflection diagrams, 77
X-Ray Diffraction, at high temperatures, 165
X-Ray Diffraction Analysis, 397
X-Ray Diffraction Photography, shortening of exposure, 74
X-Ray Diffraction Specimens, extrusion die for, 388
X-Ray Fluorescence Analysis, 275, 396
X-Ray Installation, 162
X-Ray Lines, broadening in cold-worked metals, 271
X-Ray Metallography, 77
X-Rays, determination of stress, 163, 271; industrial uses, 388

Yield Point,
determination, by extension diagrams, 161; in bend tests, 385; in bending and torsion, 268
Yield Strength, determination, 268

Zinc,
corrosion, in hot water, 169
electrodeposition, 383
for cathodic protection, 168, 274
melting, use of cast iron pots, 377
Zinc-Coated Steel, corrosion in hot water, 169
Zinc Coatings, chemical treatment, 265
Zinc Plating Baths, alkaline, 69
Zirconal. *See* Refractory Materials.
Zirconia. *See* Refractory Materials
Zirconium, effect in molybdenum steel, graphitization, 389; reactions in high vacuo, 170

NAME INDEX

Abanov, L. V., tests of brittle metals, 385
Abbey, H. R., elected Member, 189
Ableidinger, K., effect of magnetic fields on transformations in steel, 163
Abott, J. L., X-ray fluorescence analysis, 396
Abramson, S. I., constant spark conditions in spectrographic analysis, 275.
Ackley, F. E. *See* Ryan, A. P.
Ackroyd, D., elected Associate, 189
Acland, T. St. H., elected Member, 189
Adams, M. E. *See* Butlin, K. R.
Adelt, M., and **G. A. Gruendler,** determination of phosphorus, chromium, nickel and molybdenum, 171
Adey, C. F., graphite eutectic in cast iron, 391
Adler, K. F., photo-electric exposure meter, 165
Afonskii, I. F., critical quenching rates for steel, 269
Agroskin, A. A., and **I. G. Petrenko,** electrical resistance of coal, 55
Akers, E. H., and **P. Clarke,** cleaning producer gas, 56
Akhumov, E. I., melting points of iron carbide and iron silicide, 270
Aleinchenko, G. T. *See* Pishikov, G. P.
Alexander, H. L., descaling, 157
Alferova, N. S. *See* Pishikov
Allardt, E. W., resistance welding of tubes, 156
Allen, A. H., permanent mould casting, 152
Allen, N. P., metallurgical research at N.P.L., 165
Allison, D. M. *See* Harvey, G. M.
Allsop, H., biographical note, 367
Allsop, H., and **P. W. Bygate,** *Paper*: Grain Growth in Silicon–Chromium Valve Steel, 318
Al'tshuler, L. V., classification of alloys, 392
Alvarado, B., and **R. Sarmiento,** iron ore in Colombia, 371
Alvey, W. H., biographical note, 141; forging plant, 378; *Paper*: "Modern Heavy Forging Plant," 119
Ambrosioni, A., foundry resins, 152
Amelin, A. G., and **B. V. Mikhalchuk,** photoelectric analysis of gases, 172
Ames, L., welding of castings, 381
Amtsberg, H. C., precision casting of stainless steel, 152
Anderson, A. B., interior cleaning of pipe lines, 266
Anderson, C. A., induction heating of springs, 153
Anderson, E. L., maintenance in steel plants, 278
Anderson, J. S., roasting and reduction processes, 145
Andrew, J. H., awarded Bessemer Medal, 365
Andrew, K. *See* Gulbransen, E. A.
Andrew, S., elected Member, 189
Andrews, K. W., alloys amorphous with iron–chromium sigma phase, 78
Annich, M. E., job evaluation, 80; time studies, 80
Anthes, J. F., mixed gases, 146
Anthony, J., mould coatings for centrifugal castings, 258
Antonioli, A., oxygen equilibria in steel, 58
Apri, R., tool steel, 390
Arbel, C., "two-load" determination of tensile curves, 161
Arbogast, A. H., determination of dust in gas, 398
Archer, F. G. *See* Eilerts, C. K.
Arend, H. *See* Eilender, W.
Arkharov, V. I., and **F. P. Butra,** structure of iron scale, 168
Arkharov, V. I., and **S. T Kiselev,** carbide separation in tempering of alloy steel, 391
Armstrong, H. H., and **F. F. Schlitt,** annealing of coiled strip, 154
Armstrong, W. M. *See* Cummings, J. M. and Scott, D. A.
Asbeck, W., rolling-mill processes, 380
Ashkinazi, M. O. *See* Grenberg, E. I.
Ashkinazy, S. B., and **J. J. Preisler,** bonding electrical laminated cores with resin, 388
Astaf'ev, S. S. *See* Gel'man, A. S.
Astbury, N. F., electrical sheet steel, 387; magnetic testing, 73
Astbury, N. F., and **S. P. Roper,** silicon meter for electrical sheet steels, 171
Atkinson, G., elected Member, 189
Atkinson, G. D., elected Associate, 189
Aubertin, F. *See* Crussard, C.
Austin, J. B., theories of hardening, 173
Austin, W. W., Jun., machinability of cast iron, 157
Averbach, B. L. *See* Lement, B. S.
Averbach, B. L., and **M. Cohen,** isothermal decomposition of martensite and retained austenite, 166
Avery, H. S., hard surfacing, 67
Ayers, F. R., preparation of surfaces prior to painting, 159

Babaev, M. V., determination of carbon, 396; determination of chromium in ferro-chromium, 171; determination of silicon in ferro-silicon, 172
Babcock, H. J., salt baths, 258
Babko, A. K., interference of foreign ions in colorimetric analysis, 277
Babko, A. K., and **M. M. Korsun,** colorimetric analysis, 396
Bablik, H., effect of titanium in galvanizing, 383; elected Member, 189
Babushkin, S. A., and **M. L. Pogrebinskaya,** determination of ferric iron, 276
Back, L. H. *See* McKeown, J.
Baeyens, P., throwing power of cyanide cadmium plating solutions, 266
Bagaryatskii, Iu. A. *See* Umanskii, M. M.
Bagsar, A. B., cleavage fractures in mild steel, 72
Bailey, E. T. W., oxygen in oil-fired open-hearth furnaces, 149
Bailey, F. W. J., elected Associate, 189
Bailey, T. C., oil-fired O.H. furnaces, 58
Bailey, W. H. *See* Rankine, J.
Bailly, A., malleablizing furnace, 259
Bailly, L. E. S. H. le. *See* Le Bailly, L. E. S. H.
Bain, E. C., developments in steelmaking 174; metallurgical research, 255
Bainbridge, C. G., *Book*: "Gas Welding and Cutting," 400
Baker, H., elected Associate, 189
Baker, O. H., forging of magnets, 379
Baker, W. O. *See* Johnson, W. H.
Balden, A. R. *See* Heussner, C. E.
Baldina, L. M., M. V. Dekhtjar, and **A. M. Gorbunov,** magnetic determination of ferrite in incomplete hardening, 74
Baldwin, A. T., galvanizing, 69
Balfour, B. T., blast-furnace practice, 373
Ballay, M., iron–beryllium–carbon alloys, 164
Banerjee, C. J. *See* Mitra, H. K.
Banks, J. F., elected Associate, 189
Barat, R., forging, 379
Barclay, D. K., H.F. furnaces, 60
Bardin, I. P., research in Russia, 174
Bardot, M., action of molten light alloys on cast iron, 79; brittleness in galvanized malleable cast iron, 73; die steels for aluminium castings, 76
Barkov, B. J., determination of copper in ferro-titanium, 171
Barkow, A. G. *See* Grotenhuis, M.
Barnard, K. N., corrosion of steel in sea water, 393
Barnes, H., *Paper*: "Studies on Anti-Fouling Compositions," Parts I to III. *Joint Discussion*, 98. *Correspondence*, 99. *Author's Reply*, 99; anti-fouling compositions, 160
Barnes, H., M. W. H. Bishop, and **K. A. Pyefinch,** *Paper*: "Service Tests of Experimental Anti-Fouling Compositions." *Discussion*, 98
Barnett, W. J., and **A. R. Troiano,** grain-size effect on martensitic transformations, 166
Barnum, E. R., R. G. Larsen, and **A. Wachter,** rust-preventive oils, 168
Baron, H. G., biographical note, 141; *see also* Hodgson, C. C.
Baron, J., ignition loss of iron ore, 275
Barr, W., elected Member of Council, 283
Barr, W., and **A. J. K. Honeyman,** ship plates, 273
Barrallon, G., core binders, 61
Barrer, R. M., gas/metal equilibrium, 163
Barrett, E. P., and **C. E. Wood,** sponge iron, 149
Barringer, E. C., American scrap market, 375
Barritt, D. T., coking of low-ash coal, 254
Barros, C. R., and **V. L. Ré,** gamma-ray inspection of castings, 74
Bashforth, G. R., control in truments in open-hearth practice, 256; *Book*: "Manufacture of Iron and Steel," 400
Bassett, J. B., and **E. S. Rowland,** effect of chromium on M_S point, 166
Bastian, E. L. H., lubricants for wire-drawing, 260
Bastien, P., forgeability of metals, 379; pickling embrittlement, 271
Bastien, P., and **L. Beugras,** tensile tests of cast iron, 70
Bastien, P., J. Bleton, and **E. de Kerverseau,** supersonic waves in metals, 74
Bastien, P., and **Suzanne Daeschner,** action of molten light alloys on cast iron, 78; corrosion of cast iron by aluminium, 395
Bat, A. A. *See* Fridman, Ya. B.
Bateson, E., cleaning prior to painting, 97
Baukloh, W., gas-carburizing of iron, 63
Baumann, H. N., jun., high-temp. microscopy, 76
Baxter, C. E., maintenance in steel plants, 255
Bayer, E. C. *See* Holcroft, H.
Bayer, E. C., and **Larson, M. R.,** carbo-nitriding, 64
Bayhi, J. F., *See* Ewing, S. P.
Beall, J. V., heavy-density flotation, 371
Beaver, H. L., barrel finishing of stainless steel, 264; barrel polishing, 68
Beckel, A. *See* Daeves, K.
Bedell, H. L., and **V. W. Hatchett,** corrosion prevention in oil refineries, 274
Beech, A. S., foundry mechanization, 62
Beeching, R., and **W. Nicholls,** pitting of gears, 270
Bell, W. C. E., belt conveyors, 361

Bellingham, L., elected Associate, 189
Belyaev, S. E. *See* Davidenkov, N. N.
Belyaeva, A. P. *See* Bondarenko, M. M.
Belyankin, D. S., and **V. V. Lapin**, slags from ferro-chromium heats, 376
Bénard, J., elected Member, 189; oxidation of iron and copper, 170; X-ray crystallography, 77
Bénard, J., and **P. Lacombe**, straining of single crystals, 77
Benedicks, C., allotropy of iron and helium, 392; "wetting effect" on tensile strength of solids, 170
Benedicks, C., and **R. Skorski**, upper yield point in bending, 385
Benedicks, C., and **O. Tenow**, *Paper*: The Preparation of Thin Steel Specimens by Cutting, 177
Benjamin, L. P. *See* Stern, A. C.
Berezhinskii, M. B. *See* Bogatyrev, Yu. M.
Berezina, N. V. *See* Fedot'ev, N. P.
Berg, L. G., quantitative phase analysis, 396
Bergsman, E. B., microhardness tester, 72
Bernard, P., impact tensile-test measurements by piezoelectric quartz, 70
Bernstein, J., *Paper*: Experimental Work Carried out at the British Cast Iron Research Assoc. *Discussion*, 17; peeling of malleable cast iron, 29, 33
Bernstorff, H., sintering iron powder, 385
Berry, W. R., elected Hon. Member of Council, 283
Berryman, J. H., oxygen in electric-furnace practice, 375
Bertein, F., electrolytic polishing, 68; *see also* Grivet, P.
Bertiaux, L., determination of boron, 276
Bertorelle, E., *Book*: "Galvanotecnica," 400
Beugras, L. *See* Bastien, P.
Bevan, J. L. M., elected Member, 189
Beynon, R. E., rod mills, 155
Bhatawadekar, R. G., elected Member, 189
Bichler, A., cracks in metals, 73; synthetic bentonite, 61
Biddulph, A., enamel coatings, 96
Bigelow, C. G., jun., control of heating furnaces, 258
Bikerman, J. J., *Book*: "Surface Chemistry," 80
Bilfinger, R., electrodeposition of chromium, 383
Billhardt, E. G., annealing furnaces for malleable cast iron, 65
Binder, W. O., C. M. Brown, and **R. Franks**, intergranular corrosion of chromium–nickel steel, 274
Bingel, J., calculation of heat transfer, 377
Binley, J. R., peeling of malleable cast iron, 30
Birch, D. B. *See* Demmerle, R. L.
Bischof, F., oxygen and nitrogen in arc welding, 262
Bishop, M. W. H. *See* Barnes, H.
Bishop, M. W. H., K. A. Pyefinch, and **Molly F. Spooner**, *Paper*: Interpretation of Fouling Samples from Ships, 35
Bishop, T., elected Member, 189
Bishop, T., and **K. G. Lewis**, steel castings, 377
Black, G. *See* Rosen, E.
Black, G., and **E. Rosen**, chromizing, 68
Blain, P., effect of internal stresses on hardness, 387; strip mills, 155
Blake, B. C., sound ingots, 375
Blakeborough, E., elected Member, 189
Blanc, G., metal powders, 267
Blench, S., elected Member, 189
Bleton, J. *See* Bastien, P.
Blokhin, M. A., spectrum analysis, 397
Bockris, J. O'M. *See* Kitchener, J. A.
Bockris, J. O'M., J. A. Kitchener, S. Ignatowicz, and **J. W. Tomlinson**, electrical conductivity of silicate melts, 151
Boegehold, A. L., hardenability of alloy steel, 64
Bogatyrev, Yu. M., and **B. Berezhinskii**, lamp generator for hardening, 378
Bogdanchenko, A. G., analysis of steel 277; determination of chromium in ferrochromium, 171; sampling iron at blast-furnaces, 255
Bogtstra, J. F., pretreatment of steel for painting, 67
Bohnenblust, H. F., and **P. Duwez**, plastic deformation of metals, 71
Bond, E. J., anti-corrosion primers, 92
Bondarenko, M. M., S. M. Krolevets, and **A. P. Belyaeva**, determination of sulphur in fuel, 278
Bone, V. W., elected Member, 189
Boner, C. J., and **G. W. Miller**, barium lubricating grease, 262
Booth, C., elected Member, 189
Booth, J. R., elected Member, 189
Borisova, L. V. *See* Kuz'min, L. L.
Borovkov, V. V., and **P. D. Korzh**, sorting of wire, 162
Borovskii, I. B., spectrum analysis, 397
Borsova, A. V., and **N. N. Sorokina**, spectrum analysis of permalloy, 277
Borzdyka, A. M., dispersion hardening of alloy steel, 259
Bosch, F. M., and H. Haemers, crucibles for high-frequency furnaces, 254
Bose, A. C., and **N. N. Das Gupta**, briquetting of coke breeze, 254
Bostwick, H. C., sintering powdered metal parts, 384
Boucher, J., centrifugal casting, 62
Bovey, D. E., metals comparator, 270
Bowden, J. S., *Paper*: Peel on White-heart Malleable Cast Iron. *Discussion*, 17
Bowes, E. A., elected Member, 189
Bowler, R. F., elected Member, 189
Bozzarelli, A., welded Vierendeel structures, 66
Brackenbury, V., moulding boxes, 152
Braga, V. T., determination of gases in liquid steel, 278
Braidwood, W. W., constant-change system of cupola operation, 376
Brailsford, F., electrical sheet steel, 387
Brancker, A. V., biographical note, 141; *see also* Savage, L. H. W.
Brandenberger, H., elasticity and strength, 268
Brandin, T., heat transfer, 55
Braun, W. H. *See* Schaufus, H. S.
Brauns, E., sintering of iron ore, 145
Brennan, J. M. *See* Stanbery, L. J.
Brenner, A., Polly Burhead, and **Emma Seegmiller**, electrodeposition of tungsten alloys, 266
Brewer, A. F., lubrication of gears, 66
Brewer, G., equilateral fleximeter, 386
Brewer, R. E., D. A. Reynolds, W. A. Steiner, and **R. D. Van Gilder**, coking properties of coal, 55
Breyer, G., effect of pouring temperature, mould thickness and cooling rate on quality of alloy steel ingots, 375
Bridgwater, D. *See* Gloag, J.
Briggs, P. R. A., elected Member, 189
Brimelow, J., *Paper*: Belt Conveyors, Bunkers and Chutes for Iron and Steel Works. *Discussion*, 361; belt conveyors, 156
Brisby, M. D. J., elected Member, 189
British Iron and Steel Research Assoc., Committee organization, 230
British Oxygen Co., *Booklet*: "Oxygen. Its Potentialities in Iron and Steel Manufacture," 176
Broadley, W., elected Associate, 189
Brodskii, A. Ya., argon-arc welding of stainless steel, 262
Bron, V. A., manufacture of dinas refractories, 57
Brophy, G. R., and **A. J. Miller**, nickel steel, 164
Brosch, C. D. *See* Fairfield, H. H.
Brouckere, L. de. *See* De Brouckere, L.
Broughton, B., elected Member, 189
Brower, T. E., and **B. M. Larsen**, heat balance of basic open-hearth furnace, 374
Brown, A., elected Associate, 189
Brown, A. F. C., and **V. M. Hickson**, stress concentration due to surface irregularities, 269
Brown, B. F. *See* Hawkes, M. F.
Brown, C. M. *See* Binder, W. O.
Brown, D. C., elected Associate, 189
Brown, D. I., aptitude tests of moulders, 377
Brown, D. R., rolling stock for iron and steel plant, 66
Brown, H., core binders, 152; gas evolution from core binders, 377
Brown, H., and **C. Patterson**, meteorites, 54
Brown, H. G. *See* Hodgson, C. C.
Brown, J. D., Australian blast-furnace, 255
Brown, O. E., isothermal heat treatment 378
Brown, R. J., induction hardening, 153
Brown, R. S., wear of wire rope, 387; wire-drawing machinery, 379
Brownlee, M., elected Associate, 189
Bruck, H. *See* Grivet, P.
Bruckner, W. H., and **W. E. Ellis**, strain ageing of welds, 263
Bruesewitz, R., packaging of metal parts, 70
Brun, M. *See* Thierry, P.
Brunner, G., and **A. Tschalaer**, induction heating, 64
Brutcher, H. E., elected Member, 189
Bryan, F. R. *See* Tuttle, H. A.
Bryan, J. S., awarded Williams Prize, 284 365
Brzozowski, T. J., producer practice, 56
Buckham, A. F., Nanaimo Coalfield, 54
Buckholdt, R. E., rotary-hearth furnaces, 64
Bückle, H., diffusion of metallic coatings, 158
Bukowski, St., Russian steels, 273
Bulakhova, P. A. *See* Usatenko, Yu. I.
Bullock, W., and **J. Finlay**, core sands, 258
Bullock, W. J., elected Associate, 189
Bullough, W. *See* Pearson, J.
Bundy, O. M., control of wire-drawing machinery, 260
Burchell, T., powder particle size, 384
Burg, J. R., flame hardening, 259
Burhead, Polly. *See* Brenner, A.
Burkart, H., German foundry industry, 79
Burke, J., elected Associate, 189
Burman, L. M. *See* Eilerts, C. K.
Burns, R. M., metallic surfaces, 169
Burrill, W. J., elected Associate, 189
Burshtein, R. Kh. *See* Shumilova, N. A.
Burshtein, R. Kh., and **M. D. Surova**, effect of oxygen absorbed on iron on contact potential difference, 393
Busev, A. I., potentiometric determination of manganese, 276
Bussmann, K. H. *See* Siebel, E.
Butler, O. I., polarization in nickel–iron alloys, 74
Butlin, K. R., M E. Adams, and **M. Thomas**, effect of bacteria on internal corrosion of pipes, 394
Butra, F. P. *See* Arkharov, V. I.
Buttler, M. W., elected Member, 189
Bygate, P. W., biographical note, 367; *see also* Allsop, H.
Bykov, I. E. *See* Stromberg, A. G.

Cady, E. L., heat treatment of investment castings, 378; precision casting, 377
Cagle, F. W. *See* Smith, G. F.
Caillère, S., and **F. Kraut**, oolitic ore of Moulaine, 54
Caine, J. B., dimensioning of risers, 61; *see also* Willey, R. A.
Cale, G. N. *See* Sully, A. H.
California Department of Natural Resources, *Book*: "Iron Ore Resources of California," 400
Calleja, J., corrosion of steel in acids, 394
Callenberg, W., thermal control in cupola operations, 56

Cameron, W. G. *See* Kilby, J. A.
Campbell, G. S., awarded Mond Nickel Fellowship, 284
Campbell, H. C. *See* Rozet, D.
Campbell, R. F., *Book* : "History of Basic Metals Price Control," 400
Campbell, W. G. *See* Farmer, R. H.
Campus, F., welded structures, 66
Canning, T. J., elected Hon. Member of Council, 283
Carbonnier, H. Y. *See* Voder, J. D.
Cardenas, L., X-ray machine, 162
Cardwell, P. H., and **S. J. Martinez,** corrosion of boiler steels, 394
Carlisle, S. S., biographical note, 249; electronic instruments, 163
Carlisle, S. S., and **B. O. Smith,** *Paper* : An Electrical Pressure Meter for the Measurement of Open-Hearth-Furnace Differential Pressures, 222
Carnahan, P., rolling of strip, 155
Carpenter, H. B., rust preventive compounds, 159
Carrier, G. F. *See* Winzer, Alice, 72
Carter, P. T., sulphur removal in steelmaking, 150
Cassan, H., distillation period in carbonization, 372
Castagneri, F., refining of steels, 150
Castro, E. de. *See* De Castro, E.
Catterall J. A., elected Associate, 189
Cavallaro, L., and **A. Tani,** calorimetric study of corrosion, 392
Cave, G. C. B., magnetic stabilizer, 275
Cellan-Jones, G., benzole recovery, 146
Chamagne, L., H. Granjon, and **A. Leroy,** electrolytic polishing, 77
Chamberland, H. J., cutting gates and risers 153
Chambre Syndicale des Producteurs d'Aciers Fins et Speciaux, *Book* : "Les Aciers Fins et Spéciaux Français." 80
Champion, F. A., protective coatings, 92
Chapman, H. A., elected Member, 189
Charmeau, A., ingot moulds, 61
Charova, A. M., and **E. B. Rutenburg,** determination of ferrous oxide, 171
Charrin, V., titanium ore in France, 54
Chase, H., gravity die-casting, 62; heating furnaces, 258; plastic patterns, 62; stamping of automobile parts, 260
Chateau, M. *See* Pomey, J.
Chaudron, G., corrosion tests, 78; oxidation of iron and ferrous oxide transformations, 170
Cheburkova, E. E., determination of silicon, 276
Checkik, N. O., direct-current amplifiers, 175
Cherkashina, T. V., *See* Goriushina, V. G.
Chesters, J. H., *Book* : "Iron and Steel," 176, 399; cinematography of furnace flames, 374
Chiaverini, V., stainless steel, 390
Chipman, J., activities in liquid metallic solutions, 150; metallurgical education, 174; *see also* Dastur, M. N.
Chirkov, S. K., determination of aluminium in ores, 170; polarographic analysis, 397
Chmanenkov, I. V., and **K. Kh. Taguirov,** smelting of titaniferous iron ore, 148
Choura, J. *See* Simek, B. G.
Chrisp, J., elected Member, 189
Christie, N., electroplating, 69
Chyle, J. J., welded pressure vessels, 262
Chyneweth, W. R., J. U. Jeffries, R. J. La Pante, R. J. Krieger, and **G. H. Fett,** welding-arc temp., 66
Cichelli, A. E., metal spraying, 160
Cirilli, V., reduction of iron oxides, 149
Clark, D. S., and **P. E. Duwez,** tensile impact tests, 72
Clarke, J. G., elected Member, 189
Clark, W. E., and **M. L. Holt,** electrodeposition of cobalt–tungsten alloys, 383
Clarke, J., elected Member, 189
Clarke, J. A., bubble formation in vitreous enamels, 70
Clarke, P. *See* Akers, E. H.
Clarke, S. G., tests of paint coatings, 91
Clauser, H. R., gas and induction heating for hardening, 64; powder metallurgy, 385; surface finish, 381
Clayton, C. Y., obituary notice, 369
Clayton, H. R., spectrographic analysis, 275
Clements, J. F., tests of firebricks, 57
Cline, W. M., jun., gas engines, 66
Clingan, I. C. *See* Schaufus, H. S.
Clough, R. W., polariscope, 161
Cockerline, G. A., elected Member, 189
Coghlin, F., jun., oil-fired malleable iron holding furnace, 60
Cohen, M. *See* Averbach, B. L.; Harris, W. J., jun.; Lement, B. S.
Coidan, R. J., elected Associate, 189
Colas, R., water problems in steelworks, 399
Coldwell-Horsfall, J. H., elected Member, 189
Cole, T., elected Member, 189
Colegate, G. T., shot peening, 381
Coles, G. *See* Dawe, A.
Colland, A., properties of cast iron, 75
Collins, A. R., metal spraying, 160
Collins, J., elected Member, 189
Collins, J., and **R. W. K. Honeycombe,** recrystallization in deformed metals, 380
Collins, J. C., elected Associate, 189
Collins, L. J., gearing for steel-mill auxiliaries, 156
Colombelli, E., elected Member, 189
Colombier, L. *Book* : Métallurgie du Fer, 278
Comstock, G. F., effect of titanium on nitrogen content of steel, 389
Conover, H. B., surface finish, 156
Contractor, G. P., elected Member, 189
Conway, M. J., manufacture of oxygen, 174
Cook, R. M. *See* Speight, G. E.
Coomes, H. B., elected Member, 189
Copp, E. J. R., welding electrodes, 380
Cordovi, M. A., X-ray fluorescence method of analysis, 275
Cork, J. S., elected Associate, 189
Corrosion Committee. First Report of Methods of Testing Sub-Committee. *Discussion*, 91
Corson, J. H., martensite formation on wire rope, 270
Costanzo, F. E. *See* Peifer, N. P.
Cotterill, D., elected Associate, 189
Coufalik, F. *See* Simek, B. G.
Coulhon, A., kilns for refractories, 147
Coumou, D. J., colorimetric and photometric absorption analysis, 396
Cover, G. M. *See* Micksch, J. E.
Covington, C. A. *See* Cromwell, D. P.
Cowles, H. R., electric malleablizing furnace, 257
Cowley, D. K., elected Associate, 190
Cox, E. F., elected Member, 189
Cox, E. W., carburizing, 378
Coxon, W. F., creep of metals, 388; electroplating, 158
Crafts, W., and **J. L. Lamont,** secondary hardening of tempered martensitic steel, 162
Cramer, F. W., mill motors, 154
Crankshaw, E., and **K. Scheucher,** bearings, 262
Crawfurd, H. E., organization of British steel industry, 398
Crever, F. E., and **T. M. Linville,** speed stability of motors for continuous mills, 261
Criteser, D., welding automobile bodies, 66
Croissant, P., spectrographic analyses, 171
Cromwell, D. P., and **C. A. Covington** preparation of coke, 146
Cromwell, F. J. *See* McAdam, D. J., jun.
Cros, G., cleaning castings, 67
Cross, B. T. *See* Dombrook, F. L.
Cruickshank, R., Ltd., *Book* : "Electro-Plating," 400
Crussard, C., and **F. Aubertin,** thermoelectric properties of metals, 387
Ctanyukovich, A. V. *See* Gintsburg, Ya. S.
Cuckow, F. W., *Paper* : Phase-Contrast Incident-Light Microscope, 1
Cummings, J. M., and **W. M. Armstrong,** foundry sand reclamation, 60
Cunningham, C. E., flowing of tin coatings, 69
Cunningham, R. C., stainless steel for food industries, 173
Curry, T. W., resin binder for foundry sands 60
Curtis, D. W. *See* St. J. Emery, R.
Czyzewski, M., cupola practice, 376
Daas, H. C. Den. *See* Den Daas, H. C.
Daeschner, Suzanne. *See* Bastien, P.
Daeves, K., and **A. Beckel,** *Book* : "Grosszahl-Forschung und Häufigkeits-Analyse," 80
Dague, G., and **Miss A. Tabarry,** graphitization of tubes, 73
Dahl, T., hot deformation, 71
Dalahay, P., electrotitrometric measurements, 172
Dale, J. J., structure of chromium coatings, 265
Dallaville, J. M., *Book* : "Micromerities," 176
Dam, J. W. *See* Deinum, H. W.
D'Amico, E., precision casting, 61
Danese, G., shape of blast-furnaces, 373
Daniels, F. W., F. S. Gardner, and **R. M. Rood,** welding electrodes, 262
Danielsson, C., elected Member, 189
Dannat, C. W., and **H. J. T. Ellingham,** roasting and reduction processes, 145
Darken, L. S., diffusion of carbon in austenite, 164
Darr, J. H., *See* Rosenberg, S. J.
Darrah, R., design of crane cab, 155
Datchke, G. F., and **H. Lawson,** die-forging, 260
Das Gupta, N. N. *See* Bose, A. C.
Dastur, M. N., and **J. Chipman,** gas–metal equilibrium, 163
Datsenko, O. V. *See* Usatenko, Iu. I.
Dauxois, P., particle-size classification, 60
Davidenkov, N. N., determination of yield point in bending and torsion, 268
Davidenkov, N. N., and **S. E. Belyaev,** notch susceptibility in cutting of metals, 264
Davidson, H. S. *See* Huckle, W. G.
Davies, H. Leighton, biographical note. *Frontispiece*
Davies, M., experimental furnaces of B.I.S.R.A., 255
Davies, M. E., oxygen-enriched air for side-blown converters, 58
Davis, E. A., deformation law, 71; size and stored energy effects on fracture of tubular specimens, 71
Davis, E. W., Mesabi iron ore, 253
Davis, F. F., vacuum furnace control, 56
Davis, H. E., and **E. R. Parker,** biaxially stressed tests on tubes, 71
Davis, L. S., obituary notice, 369
Dawe, A., and **G. Coles,** coal seams in Britain, 253
Daws, L., time required to melt steel in open-hearth bath, 220
Dean, K. C. *See* Potter, G. M.
Deans, T., vanadium in iron ore, 371
Debenham, W. S., carbon refractories in blast furnaces, 147
De Brouckere, L., elected Member. 189
De Castro, E., oxygen-enriched air, 148
de Decker, H. C. J., corrosion in chemical industry, 167
de Decker, H. C. J., A. P. Krijff, and **J. M. Pluut,** electrolytic polishing, 264
Deimler, J. W., surface preparation of steel, 157
Deinum, H. W., and **J. W. Dam,** Orsat apparatus, 398
de Jerphanion, A., gas-fired heat-treatment furnaces, 153
de Kerverseau, E. *See* Bastien, P.
Dekhtjar, M. V. *See* Baldina, L. M.

De La Lastra y Soubrier, R., elected Member, 189
De Lattre, P., inhibitors in pickling, 382
Delaval, E., manufacture of silica bricks, 56
Delbart, G., stepped quenching, 63; substitute steels, 75
Delbart, G., and **R. Potaszkin**, *Paper*: The Mechanical Properties of a Nickel–Chromium–Molybdenum Steel Obtained by Stepped Quenching. *Corrigendum*, 190; special cast irons, 75
Delbart, G., R. Potaszkin, and **A. Kohn**, effect of titanium in alloy steel, 389
DeLong, B. *See* Myers, W. R.
Demain, W., elected Associate, 190
De Maré, E., *Book*: "New Ways of Building," 176
Demmerle, R. L., R. E. Birch, and **D. B. Hendryx**, manufacture of basic brick, 373
Den Dass, H. C., internal friction in metals, 388
Denkinger, S., jun., plastic patterns, 258
Dennis, W. E., elected Associate, 190
Denton, W. H., elected Member, 189
D'Entremont, B. Hedde, properties of steel, 385
Déribéré, M., infra-red drying, 70
Descovich, S., elected Associate, 190
Descy, A. *See* Everard, R.
de Smet, G., *Book*: La Pratique des Traitements Thermiques des Métaux, 280
De Strycker, R., creep and relaxation of wire, 389
DeVries, G., end-quenching, 269
de Waal, D. M., and **A. Strasheim**, spectrochemical sparking-off effects in flat-surface sparking steels, 172
De Wendel, F., obituary notice, 369
Diamond, E. L., and **A. M. Frankau**, *Paper*: "Present Methods of Open-Hearth Furnace Charging," 191
Diehlman, G., protective paints, 160
Di Giulio, A., aluminium coatings, 159
Dimmock, R. H., elected Member, 189
Dimon, R. A., plating tests of strip, 69
Dinger, F. R., roll turning, 263
Dinsdale, C., *Book*: "Prevention of Iron and Steel Corrosion," 175; anti-fouling compositions, 99
Dityatkovskaya, R. V. *See* Stromberg, A. G.
Dodd, A. E., work of British Ceramic Research Association, 146
Doherty, F. C., rubber belt conveyors, 362
Dokin, N. J., galvanizing, 265
Dolan, T. J. *See* Mantle, J. B.
Doležal, R., burning low-grade coal, 54, 55
Doll, D. T. *See* Faber, A. F.
Dombrooke, F. L., B. T. Cross, E. M. Powell, and **W. A. Pollock**, pulverized coal, 146
Doncaster, B., elected Hon. Member of Council, 283
Donworth, R. B., boiler corrosion, 167
Dorman, A., biographical note (*facing*), 176
Dorn, J. E., A. Goldberg, and **T. E. Tietz**, strain-hardening of metals, 162
Dorn, J. E., and **A. J. Latter**, elastoplastic deformations, 71
Dornin, G. A., jun., sound ingots, 375
Dovey, D. M., sulphide penetration and peeling of malleable cast iron, 26
Dovey, D. M., and **I. Jenkins**, gas carburizing, 378
Downie, T., elected Member, 189
Dowswell, W. R., elected Associate, 190
Dravnieks, A., and **H. J. McDonald**, gas–metal reactions, 168
Dreyfus, L., induction heating, 259
Drigo, A., and **M. Pizzo**, magnetization of ferromagnetic films, 387
Droste, W. H., weathering tests of paints, 266
Druyvesteyn, M. J., physics of metals, 385
Dubois, H., and **G. Hénon**, manufacture of rolls, 59
Dubovoj, V. J. A., flakes in steel, 73
Duckworth, A., elected Associate, 190
Duffy, C. E., slab heating furnaces, 258
Dufty, N. F., desiliconizing of pig iron, 148
Dumas, M., and **P. Maheu**, statistical methods in industry, 174
Dummett, W. M., core-making, 377
Du Mond, T. C., cleaning of metals, 381; free cutting steel, 390
Duncanson, Sir J., elected Hon. Vice-President, 283
Dunger, C., elected Associate, 190
Dunmore, O. J., elected Associate, 190
Dupeis, B., gas analysis, 398
Duport, J., crack detection, 72
Durand, S. R., induction heating, 258
Durrer, R., world production of iron, 398
Durst, G. F. *See* Grotenhuis, M.
Duryee, L. M., radio-frequency heating, 64.
Duwez, P. *See* Bohnenblust, H. F.: Clark, D. S.
Duwez, P., and **C. B. Jordan**, formation of alloys in powder metallurgy, 385
Dyatlov, A. A., and **A. I. Verkhoshapov**, film adaptor for microscopes, 390
Dyke, B. H. Van. *See* Van Dyke, B. H.
Dymov, A. M., ethereal extraction of iron from ferrous alloys, 172

Eastwood, H., elected Associate, 190
Ebert, L. J. *See* Ripling, E. J.
Eborall, F. E., determination of chromium in high-speed steel, 171
Edmonds, E., elected Associate, 190
Edwards, A. H., analysis of fuel, 398
Edwards, W. A., salt spray corrosion tests, 92
Efroimovich, Yu. E., regulation of electric furnaces, 255
Egginton, H. H., thickness measurement of coatings, 382
Eggleston, G. K. *See* Simpson, V. A.
Egri, G. H., high-frequency heating of tinned sheets, 159
Eichinger, A., creep curves, 163
Eickhoff, A. J., and W. E. Shaw, organic coatings, 266
Eickworth, E., nitrogen in basic Bessemer steel and pig iron, 149
Eijnsbergen, J. F. H. von. *See* von Eijnsbergen, J. F. H.
Eilender, W. *See* Jurich, H.
Eilender, W., H. Arend, and **E. Schmidtmann**, effect of heat-treatment on chromium coatings, 159; gas content of chromium coatings, 158; hardness of chromium coatings, 158
Eilerts, C. K., Faye Green, F. G. Archer, Betty Hanna, and **L. M. Burman**, corrosion-resistance of steel to gas-condensate fluids, 168
Eisaman, J. H., oxygen in electric furnace process, 150
Eisel, F. *See* Voigt, H. F.
Eisenberg, R., and **R. J. Raudebaugh**, impact strength of weld deposits, 263
Eisenkolb, F., compacting of iron powders, 267; drawing properties of sheets, 379; sintered-iron machine parts, 160
Eketorp, S. *See* Petterson, H.
Elenevskaya, E. V. *See* Shpeizman, V. M.
Elistratov, P. S., coated welding electrodes, 262
Elkington, F., elected member, 189
Ellingboe, W., drawing of stainless steel, 260
Ellingham, H. J. T. *See* Dannat, C. W.
Elliott, J. E., elected Associate, 190
Ellis, W. E. *See* Bruckner, W. H.
Elm, A. C., protective paints, 266
Elmen, G. W., and **E. A. Gaugler**, magnetic alloys, 270
Elsea, A. R. *See* White, W. H.
Ely, R. J. *See* Flinn, R. A.
Emery, R. St. J., and **D. W. Curtis**, determination of tungsten in high-speed steels, 171
Emmett, P. H., metal surfaces, 169
Endell, K., synthetic moulding sands, 61
Engel, E., coating of metals, 381
Entwisle, A. R., elected Associate, 190
Erbe, J. R., pickling of strip, 382
Erdmann-Jesnitzer, F., effect of nitric acid on ferro-silicon coatings, 159
Erker, A. *See* Thum, A.
Erkin, L. I., contraction of charge in coking, 254
Erkin, L. I., and **L. I. Gorbunova**, volume changes during coking, 55
Esin, O. A., effect of silicic acid on slag–metal equilibrium, 256
Espenotte, L., hard-chromium-plating, 68; structure of chromium deposits, 68
Ess, J. E., iron and steel in Philadelphia, 174
Ess, T. J., plant of Carnegie Illinois Steel Corp. 255; strip mill of Republic Steel Corporation, 261
Eugène, F., grinding of metals, 264
Evans, D. J. I., elected Associate, 190
Evans, F. A., elected Member, 189
Evans, J. T. *See* Patterson, W. R.
Evans, N. L., descaling by sodium hydride process, 67
Evans, R. M. *See* Nekervis, R. J.
Evans, U. R., cementiferous paints, 100; corrosion tests of painted specimens, 95; film formation, 169; mill scale under paint coatings, 95; *see also* Gould, A. J.
Eveley, R. *See* Fienburgh, W.
Everest, A. B., alloy cast iron, 272, 390; high-duty cast iron, 164
Everhart, J. L., proportional limit of steel, 268.
Evrard, R., and **A. Descy**, *Book*: Histoire de l'Usine des Vennes," 280
Ewing, S. P., and **J. F. Bayhi**, cathodic protection of well casings, 79
Eyring, H. *See* Fredrickson, J. W.
Eyt, E., gases in steel and cast iron, 62

Faber, A. F., jun., and **D. T. Doll**, feeding of castings, 61
Fabert, H. A., jun. *See* Micksch, J. E.
Fairfield, H. H., and **C. D. Brosch**, core-drying, 61
Falk, R. S., training of foundrymen, 174
Fal'kevich, A. S., properties of welded joints, 263
Faltus, F., bend tests of welds, 156
Fancutt, F., accelerated corrosion tests, 92; mill scale under paint coatings, 95
Farmer, R. H., and **W. G. Campbell**, coking of resin, 55
Farmery, H. K., elected Associate, 190
Farnsworth, W. M., arc furnace practice, 374; electric furnaces, 256
Farrant, J. L., and **A. J. Hodge**, interferometric calibration of electron microscope magnification, 165
Farrell, D., safety precautions in works, 278
Farthing, T. W., elected Associate, 190
Fast, J. D., role of oxygen in welding, 380
Faust, C. L., electropolishing, 157
Feaver, A. R., elected Associate, 190
Fedot'ev, N. P., N. V. Berezina, and **E. G. Kruglova**, hydrogen evolution, 271
Feitknecht, W., oxide films, 170
Feltham, P., fatigue of metals, 269
Fenner, E., and **L. Koch**, oxide coatings, 69
Fett, G. H. *See* Chyneweth, W. R.
Fetters, K. L., M. M. Helzel, and **J. W. Spretnak**, inclusions in alloy-steel ingots, 151
FIAT Review of German Science, *Books*: "Inorganic Chemistry," "Geology and Palaeontology," "Physics of Solids," 279; "Non-Ferrous Metallurgy," 175
Fielding, T., surface defects on tinplate, 266; tinplate, 159
Fienburgh, W., and **R. Eveley**, *Book*: "Steel is Power," 176

Fifield, J. E., and **J. H. Schaum**, solidification of cast iron, 62
Filippi, F., and **A. Nava**, phosphatizing, 159
Finch, J., iron sand in New Zealand, 371
Fink, C. G., and **J. S. Smatko**, corrosion of stainless steel in the human body, 395
Finkelshtein, D. N., and **A. I. Kruzhevnikova**, determination of manganese compounds in air, 172
Finlay, J. *See* Bullock, W.
Firdman, R. A., and **V. S. Pellinets**, temperature regulator, 146
Firth, T. G., elected Member, 189
Fischer, H., structure of electrolytically produced crystals, 68
Fischer, J., throwing power of plating baths, 158
Fisher, A. J., cover-annealing, 154; fuel oil in steel production, 56
Fisher, G. A. *See* Johnson, H. H.
Fisher, J. C., measurement of inter-facial tensions, 166
Fisher, J. C., J. H. Hollomon, and **D. Turnbull**, nucleation, 78
Fitzgerald, R. C., A. B. Wilder, G. V. Smith, and **A. E. White**, chromium–molybdenum steel pipe, 272
Fitzgerald-Lee, G., magnetic materials, 270
Flagg, H. V., soaking pits, 377
Flagg, J. F., *Book*: "Organic Reagents," 280
Flament, P., trichlorethylene, 67
Flanders, H. E., coke reactivity, 56
Fleisch, C. J., carbon hearths, 255
Fleming, D. H., flame cutting of stainless steel, 157
Flinn, R. A., and **R. J. Ely**, hardenability of grey iron, 73
Flux, J. H., elected Member, 189
Foley, F. B., large ingots, 375
Fontaine, W. E., corrosion of stainless steel by corrosion products, 395
Fontana, M. G. *See* Leslie, W. C.; Zambrow, G. L.
Forbes, C. L., elected Member, 189
Forbes, W. A. D., anti-fouling compositions 99; painting of ship plates, 101
Ford, H., cold rolling, 380
Forgeng, W. D., colour micrography, 165
Fornander, S., oxygen in basic open-hearth process, 149
Förster, S., surface hardening, 64
Forward, F. A. *See* Scott, D. A.
Foster, L. C., elected Member, 189
Fraenkel, S. J., biaxially stressed mild steel in plastic range, 71
Frankau, A. M., biographical note, 249. *See also* Diamond, E. L.
Franklin, F. F., manganese–vanadium steel plates, 76
Franks, R., structure of temperature-resistant metals, 77; *see also* Binder, W. O.
Frasch, J., preparation of surfaces prior to painting, 159
Frede, L., recruiting foundry workers, 63
Fredrickson, J. W., and **H. Eyring**, flow mechanism and tensile properties, 71
Freeman, J. W. *See* Reynolds, E. E.
French, H. J., alloy steel, 75
Freudenthal, A. M., and **M. Reiner**, work-hardening law, 72
Fridman, Ya. B. *See* Roitman, I. M.
Fridman, Ya. B., and **A. A. Bat**, deformation of metals, 269
Fridman, Ya. B., and **I. M. Roitman**, bend tests on discs, 268
Friedman, J. H., cold forging, 260
Friend, W. Z., alloys for chemical equipment, 173; corrosion of metals in sulphates, 394
Frischman, T. A., controlled atmospheres in annealing, 65
Frith, J. G., biographical note, 249
Frocht, M. M., photoelasticity, 386
Fromm, H., grain structure of metals, 391
Fuchs, H. O., residual stresses, 386
Fuller, L. E., maintenance shops, 175
Funk, E. J., jun., premixing air and fuel for combustion, 372
Furth, M. A., corrosion of heat-exchanger tubes, 274

Gabor, D., electron interference microscope, 76
Gaillard, P., and **F. Gayte**, determination of chromium in cast iron, 276
Gaines, J. M., and **G. M. Skinner**, oxygen in electric furnace practice, 375
Gallacher, W., elected Associate, 190
Galliford, A. E. B., elected Member, 189
Gamazkov, S. M., power used in H.F. heating, 64
Gamwell, A., elected Member, 189
Gardam, G. E., action of organic sulphonates in nickel plating, 265
Gardam, G. E., and **J. F. Mills**, surface appearance of polished metals, 391
Gardner, E. J., effect of coke quality on blast-furnace operation, 57
Gardner, F. S. *See* Daniels, F. W.
Garry, S. G., training of foundrymen, 174
Garside, J. E., *Book*: "Process and Physical Metallurgy," 400
Garvin, S. J., awarded Mond Nickel Fellowship, 284; powder metallurgy, 384
Garwig, G. W., and **A. L. Thurman**, cold drawing tubes and bars, 379
Gaugler, E. A. *See* Elman, G. W.
Gavripenko, V. S., forge furnaces, 258
Gaydon, A. G., *Book*: "Spectroscopy and Combustion Theory," 400
Gaydos, F. J., welding in steel mills, 263
Gayte, F. *See* Gaillard, P.
Gebauer, K., hard chromium plating, 158; *see also* Wahl, H.
Gedsehold, H. *See* Trömel, G.
Geerlings, H. G., elected Member, 189
Geibig, F. C., preheating damaged castings before welding, 67
Geiger, C. F., A. A. Turner, and **O. R. Stach**, refractories, 373
Geil, G. W. *See* McAdam, D. J., jun.
Geilenkirchen, T., foundry management, 63
Geist, K. R., investment casting, 62
Gellman, A., degreasing of metals for organic coatings, 67
Gel'man, A. S., and **S. S. Astaf'ev**, spot welding of steel, 262
Génin, G., induction heating of varnishes, 266
Gentry, C. H. R., analysis of magnetic alloys, 171
Gérard, P., porous chromium plating, 68
Gerber, W., and **U. Wyss**, hardenability of steel, 153
Germer, L. H. *See* Lauder, J. J.
Gernelle, H., cupola practice with poor coke, 59; production of cast iron in rotary furnaces, 59
Geuder, R. A. *See* Hough, W. R.
Geurts, J. J. *See* Pieters, H. A. J.
Gibbons, W. L., heat-treatment plant of La Pointe Machine Tool Co., 153
Gibson, N., elected Associate, 190
Gifkins, R. C., and **W. P. Rees**, stress-corrosion cracking of gas cylinders, 186
Gilbert, P. T., corrosion of zinc, 169
Gilbertson, T., and **R. Robinson**, nitralizing process, 264
Gilder, R. D. van. *See* van Gilder, R. D.
Gilham, E. W. *See* Scott, F.
Gilhespy, W. M., elected Member, 189
Gille, R., continuous pickling, 157
Gilleland, W. H., and **W. D. Hacker**, plate mill at Homestead, 155
Gillespie, J. E., mineral wool, 57
Gillet, E., hard-chromium coatings, 68; preparation of parts prior to chromium coating, 68
Gilman, J. J., P. K. Koh, and O. Zmeskal, effect of delta ferrite and sigma formation in steel, 392
Gilson, H. B., welding of cast iron, 157
Ginsburg, L. B., and **Iu. Iu. Lure**, determination of molybdenum, 171
Ginsburg, Y. S., temperature regulator, 254
Gintsburg, Ya. S., K. A. Lanskaya, and **A. V. Ctanyukovich**, niobium in chromium–molybdenum steel, 270
Girardet, L. F., and **A. Guédras**, cementation of cast iron, 75
Girardot, E. H., die-setting, 260
Girdler, T. W., welding of tools and dies, 67
Girschig, R., powder metallurgy, 267
statistical methods in industry, 174
Giulio, A. di. *See* di Giulio, A.
Glasstone, S., *Book*: "Thermodynamics for Chemists, 280
Gleichmann, H., and **K. H. Zepter**, concentration of spathic ore, 145
Gleyzal, A., plastic deformation of circular diaphragm, 72
Glickman, L. A., and **V. P. Tyekht**, residual stress in austenitic steel, 272
Gloag, J., and **D. Bridgwater**, *Book*: "History of Cast Iron in Architecture, 280
Godbehere, A. S., elected Member, 189
Godfroid, H., elected Member, 189
Goerens, P., *Book*: "Einführung in die Metallographie," 400
Goffart, J., thin iron castings, 62
Goldberg, A. *See* Dorn, J. E.
Goldberg, H. *See* Stern, A. C.
Goldschmidt, H. J., carbides in alloy steel, 273; carbides in chromium steel, 273
Goldsmith, J. R. *See* Ziegler, N. A.
Golovin, A. V., sorting of pig iron, 398
Golubtsova, R. B., determination of tungsten, 171
Gomez Ruimonte, F., effect of cobalt in determination of nickel in steel, 277
Gooderham, W. J., gas analysis, 398
Goodeve, C. F., physico-chemical principles in process metallurgy, 150
Goodeve, C. F., and **K. H. Jack**, nitrogen evolution from iron–nitrogen alloys, 163
Goodger, A. H., elected Hon. Member of Council, 283
Goodrich, W. E., defects in ingots, 151
Goodwin, C. R., elected Member, 189
Goodwin, E. C., elected Member, 189
Gorbunov, A. M., *See* Baldina, L. M.
Gorbunova, L. I. *See* Erkin, L. I.
Gordet, A., alloy additions to galvanizing baths, 159
Goriushina, V. G., and **T. V. Cherkashina**, analysis of tungsten and molybdenum alloys, 171
Goss, N. P., X-ray metallography, 77
Gottschalk, V. H., iron powder, 255
Gould, A. J., *Paper*: "Corrosion-Fatigue of Steel under Asymmetric Stress, in Sea Water," 11
Gould, A. J., and **U. R. Evans**, effect of shot-peening on corrosion fatigue of steel, 169
Gould, J. W., elected Associate, 190
Gower, R., elected Associate, 190
Graf, J. E., German steel industry, 174
Graff, A., use of coke-oven gas, 254
Granjon, H., fusion welding, 66; *see also* Chamagne, L.
Grant, F. R., sheet mill of Columbia Steel Co., 261
Grassam, B. W., elected Associate, 190
Gratsianskii, N. N., and **P. F. Kalynzhnaya**, chemical stability of tin coatings, 266
Gratzl, M., ageing of lubricants, 66
Gravenstreter, J. P., lubricating systems, 262
Gray, A. G., exposure tests of organic coatings, 68; thickness measurements of coatings, 158
Green, Faye. *See* Eilerts, C. K.
Greene, T. W., stress-relief of welds, 65, 263
Greenwood, H. W., metal spraying, 384
Gregg, A. W., side-blow converters, 58
Grenber, E. I., and M. O. Ashkinzai, determination of molybdenum in chromium steel, 277
Grenier, G., dephosphorizing and desulphurizing pig iron, 57

Griffen, J., coal mining and preparation 146
Griffis, LeVan. *See* White, M. P.
Grigoriev, A. T., and **D. L. Kudriavcev**, polymorphic transformations in chromium steels, 78
Grison, M., oxygen in iron and steel manufacture, 256
Grist, C. H., elected Member, 189
Grivet, P., H. Bruck, and **F. Bertein**, electron microscope, 76
Gröninger, K. G., induction heating, 259
Gros, H., abrasives, 68; barrel polishing, 67; electrolytic deposits, 68; impurities in nickel-plating baths, 68; phosphatizing in wire-drawing, 69; surface finishing of stainless steels, 67.
Grosso, J., *Book*: "Thermique Pratique," 176
Grotenhuis, M., G. F. Durst, and **A. G. Barkow**, die for X-ray diffraction specimens, 388
Gruendler, G. A. *See* Adelt, M.
Guarnieri, G. *See* Miller, J.
Gudtsov, N. T., and **L. D. Mashtakova**, effect of niobium in tungsten steel, 273
Guédras, A., analysis of slags and ores 171. *See also* Girardet, L. F.
Guédras, M., cupola practice, 257
Guenerozov, B. A., determination of chromium and uranium, 171
Guenot, R., awarded Carnegie Research Grant, 284
Guenzi, E. *See* Hénon, G.
Guérin, H., and **Marthe Moreau**, determination of sulphur in coal, 173
Guess, R. D. *See* Libsch, J. F.
Guillamon, J., taphole plugging device, 376
Guillaud, C., and **J. Wyart**, ferromagnetic alloys, 163
Guillaumin, H., electrolytic iron, 149
Guinard, Lorraine iron ore, 253
Guinier, A., and **J. Tennivin**, X-ray study of crystalline structure, 165
Gulbransen, E. A., electron diffraction in study of corrosion processes, 168; surface oxidation of metals, 168
Gulbransen, E. A., and **K. Andrew**, metal reactions in high vacua, 170
Gulyaev, A. P., nomogram for hardness determination, 387
Gundry, W., elected Member, 189
Günthner, O., hot-blast cupolas, 257
Gupta, H. S., elected Member, 189
Gupta, N. N. Das. *See* Das Gupta, N. N.
Guterman, V. M. *See* Lebedev, T. A.
Guthmann, K., driving rate of blast-furnaces, 255
Gwathmey, A. T., single crystals, 165

Hacker, W. D. *See* Gilleland, W. H.
Hadfield, D., thermo-electric properties of metals, 270. *See also* Oliver, D. A.
Haemers, H., desulphurization in induction furnace, 150; *see also* Bosch, F. M.
Haenel, J. G., corrosion of steel cables, 79
Hagen, J., gating of castings, 61
Haker, J., elected Member, 189
Hall, A. M., and **S. L. Hoyt**, graphitization of steel, 271
Hall, J. A., effect of smoke in pyrometry, 146
Hall, J. H., centrifugal casting, 152
Halliday, W. M., machining of work-hardening steel, 157
Halstead, H. L., relation of power load to steam balances, 254
Halut, R., and **P. Rocquet**, electrolytic polishing, 68
Halut, R. E., electrolytic polishing, 264
Hamaker, J., determination of sulphur in fuel, 173; determination of volatile matter in coal, 278
Hammond, C. P., rolling hexagons and octagons, 155; rolling of rounds, 155
Hammond, H. J. *See* Holcroft, W. J.
Hammond, R., protective paints, 266
Hammond, R. A. F., thickness determination of lead coatings, 68
Hancock, P. F., peeling of malleable cast iron, 20
Hanlon, N., elected Member, 189
Hanna, Betty. *See* Eilerts, C. K.
Hansen, M., stresses in welds, 381
Hanssen, W. J. *See* Pieters, H. A. J.
Hanstock, R. F., damping capacity, 270
Happich, J., core binders, 152
Harding, B. W., elected Member, 189
Hardy, H. M., and **T. O. Kuivenen**, stress measurements, 72
Haring, W. J., lubricants, 66
Harrell, J. D., cadmium-plating, 69
Harris, F. E., carburization and decarburization of steel, 259, 378
Harris, W. J., jun., and **M. Cohen**, austenite–martensite transformations, 166
Harrison, G. R., R. C. Lood, and **J. R. Loofbourow**, *Book*: "Practical Spectroscopy, 280
Harrison, V., elected Associate, 190
Harrison, W. G., elected Associate, 190
Harry, R. J., charging of open-hearth furnaces, 256; ingot-stripping cranes, 155
Hartley, H., elected Member, 189
Hartshorn, L., radio-frequency heating, 378
Harvey, G. M., and **D. M. Ailison**, electronic speed control of rod mill, 261
Harvey, M. Y., awarded Ablett Prize, 284, 365
Haslem, M. Eleanor. *See* Zapffe, C. A.
Hasler, M. F., spectrochemical analysis of steel, 398
Hatchett, V. W. *See* Bedell, H. L.
Hauk, V., residual stresses in welds, 156; shrinkage stresses in spot welds, 263
Hawkes, J. M., elected Member, 189
Hawkes, M. F., and **B. F. Brown**, structures in cast steel, 77, 272
Hawlik, E., welding of vacuum pump, 381
Haworth, R. D., abrasion-resistance of hard-facings, 67
Hay, W., *See* Smith, W. A.
Hazen, F. D., metallic recuperators, 146
Head, J. W., thickness gauge for sheets, 155
Healey, M. V., and **R. W. Thomas**, single slag basic electric steel practice, 58
Heeley, E. J., enamel coatings, 94
Heindlhofer, K., *Book*: "Evaluation of Residual Stress," 400
Helzel, M. M. *See* Fetters, K. L.
Henderson, G. T., spectrophotometric analysis of cast iron, 276
Henderson, H. M., elected Hon. Member of Council, 283
Hendry, A. W., *Book*: "Photo-Elastic Analysis," 175
Hendryx, D. B. *See* Demmerle, R. L.
Henline, P. W. *See* Reed, F. H.
Hénon, G. *See* Dubois, H.
Hénon, G., and **E. Guenzi**, machine cast pig iron, 152
Henry-Bezy, G., *Book*: "Le Chauffage Haute Fréquence," 400
Henthorn, R. S., elected Member, 189
Herbst, H. T., electrical characteristics of Heliarc welding, 66
Herenguel, J., service life of aluminium/steel cables, 274
Herington, C. E., sound castings, 164
Hermann, F. J., paint coatings, 384
Hersche, W., dry quenching of coke, 254
Herty, C. H., jun., elected Member, 189
Herzog, E., corrosion research, 78; gaseous reduction of ore, 147
Hessenberg, W. C., wire-drawing research, 260
Heuberger, J., powder metallurgy, 161
Heurtey, P., heating furnaces, 258
Heussner, C. E., A. R. Balden, and **L. M. Morse**, structure of electrodeposits, 158
Hewitt, W., ferro-alloys, 257
Heyrovsky, J., polarographic analysis, 397
Hickman, J. W., gas–metal reactions, 170; oxide films, 168
Hickson, V. M. *See* Brown, A. F. C.
Higginbotham, W. H., elected Member, 189
Higgins, R., function of slag in open-hearth process, 374
Higgs, J. Y., elected Associate, 190
Hildebrandt, A., spinning of stainless steel, 260
Hill, R., *Paper*: "Calculation of Stresses in Ironing of Metal Cups, 41
Hiller, W., *Book*: "Stahl-Handbuch," 400
Hindley, H. R., gas analysis, 172
Hintze, O. E., protective paints, 394
Hiscock, S. A., elected Associate, 190
Hoadley, L. D., boiler house maintenance, 155
Hoar, T. P., accelerated corrosion tests, 92; cleaning metals, 67; organic inhibitor in acid attack of steel, 169; potential measurements of corrosion, 101
Hoare, W. E., electro-tinning, 69
Hochmann, J., properties of nickel–chromium steel at high temperatures, 74
Hodge, A. J. *See* Farrant, J. L.
Hodge, J. M., isothermal heat treatment, 63
Hodgson, C. C., biographical note, 141
Hodgson, C. C., and **H. G. Baron**, *Paper*: "Large Crystal Grain Size in Silicon–Chromium Valve Steel," 81
Hofmann, W., and **O. Schmitz.**, *Book*: "Metallkunde," 176
Hofmeister, B., E. Hülsbruch, and W. Mantel, by-product yield of coking plants, 373
Hager, J. J., stainless steel, 164
Holcroft, W. H., and **E. C. Bayer**, carbon control in heat-treatment of steel, 63
Holcroft, W. H., and **H. J. Hammond**, carbo-nitriding of automobile parts, 65
Holden, H. A., chemical treatment of zinc surfaces, 265
Holden, H. A., and **S. J. Scouse**, phosphate coatings in wire drawing, 379
Hollomon, J. H. *See* Fisher, J. C.
Holman, H. E., welding, 157
Holmes, D. T., *See* Sandell, W. G.
Holt, E. D., metallographic polishing, 391
Holt, M. L. *See* Clark, W. E.; Lietzke, M. H.
Holtmann, W. *See* Kootz, T.
Holton, C. R., sources of steelmaking scrap, 58
Homerberg, V. O., graphitic nitralloy, 273
Honeycombe, R. W. K. *See* Collins, J.
Honeyman, A. J. K. *See* Barr, W.
Hoover, G. R., cleaning of metals, 67
Hopkins, E. S., use of lime for corrosion control of water pipes, 78
Hopkins, J. L., elected Associate, 190
Horn, H. A. *See* Schimpke, P.
Horrell, H. G., elected Member, 189
Hortvet, R. M., heat-treatment furnaces for propellers, 64
Hoskins, J. A., elected Associate, 190
Hough, W. R., and **R. A. Gender**, adjustable speed drives, 154
Houghton, R. S., *Book*: "Metal-cutting Tools," 176
Hovis, H. L., and **A. W. Marks**, heat treating precision instrument parts, 64
Howard, A. P., elected Member, 189
Howard, E. R., thermostatic bimetal, 146
Howat, D. D., screening ores, 253
Hower, E. N., refractories, 255
Howry, A. D., steam balances for steel plant, 254
Hoyt, S. L. *See* Hall, A. M.
Hsu, L., awarded Carnegie Research Grant, 284
Huber, M. G., elected Member, 189
Hubscher, H., corrosion-resistant steel castings, 79
Hücking, G., German foundry industry, 63

Huckle, W. G., and **H. S. Davidson,** corrosion inhibiting primers, 70
Hudson, F., precision castings, 258
Hudson, J. C., *Paper*: Service Trials of Painting Schemes Applied to a Steelworks Gantry. *Discussion*, 94; atmospheric corrosion, 167; cleaning prior to painting, 101; work of British Corrosion Committee, 167
Hudson, J. C., and **T. A. Banfield,** *Paper*: "The Protection of Iron and Steel by Various Non-Metallic Coatings." *Discussion*, 94
Hughes, E., elected Member, 189
Hughes, E. B. *See* Norris, F. G.
Hughes, J. E., elected Associate, 190
Hülsbruch, E. *See* Hofmeister, B.; Mantel, W.
Hultgren, A., silicate inclusions in basic electric furnace steel, 59
Hume, W. C., elected Associate, 190
Hume-Rothery, W., *Book*: "Atomic Theory for Students of Metallurgy, 280. *Book*: "Electrons, Atoms, Metals and Alloys," 80, 175. *Book*: "Structure of Metals and Alloys, 280
Humfrey, J. C. W., effect of silicon on peeling of malleable cast iron and steel, 17
Hummitzsch, W., weldability tests, 385; welding of alloy steel, 262; welding electrode coatings, 262
Hunger, J., and **R. Seeliger,** replicas in microscopy, 165
Hurst, J. E., gases in cast iron, 271
Hurst, J. E., and **R. V. Riley,** determination of gases in cast iron, 172
Hurtig, I., scrap trade, 79
Hüttig, G. F., sintering of iron powder, 268
Hyde, R. A., paint coatings, 97

Ibbotson, J. D., elected Member, 189
Idar, K. H., electric driving of mill tables, 380
Ignatowicz, S. *See* Bockris, J. O'M.
Imhoff, W. G., electric galvanizing furnaces, 265; ventilation of wire mills, 260
Indichenko, L. N., spectrographic analysis of ores, 275
Industrial Research Institute, *Book*: "Research in Industry," 176
Institute of Physics, *Book*: "Measurement of Stress and Strain in Solids," 176, 400
Irvine, K. J., peeling of malleable cast iron 27; *see also* Preece, A.
Isenburger, H. R., supersonic tests, 388
Ishihara, H. *See* Kajima, J.
Ison, H. C. K. *See* Wormwell, F.
Ivanchenko, A. M. *See* Kostenetc, V. I.
Iwanow, N. *See* Meybeck, J.

Jablonski, S., low-temperature treatment of metals, 259
Jaboulay, B., determination of tantalum and niobium, 172
Jack, K. H., iron–carbon system, 392; iron–carbon–nitrogen system, 392; iron–nitrogen system, 392; *see also* Goodeve, C. F.
Jackman, H. W. *See* Reed, F. H.
Jackson, K. L., stresses in drawing, 379
Jackson, L. C., *Book*: "Low-Temperature Physics," 176
Jackson, L. R., K. F. Smith, and **W. T. Lankford,** plastic flow in anisotropic sheet steel, 71
Jackson, M. D., elected Associate, 190
Jacobs, F. W., malleablizing furnaces, 65
Jacobson, H. J., core blowing, 258; core boxes and blowing machines, 61
Jacquelin, P., metallization, 70
Jacquet, J., heat treatment of tool steel, 153
Jacquet, P. A., electrolytic polishing, 76, 77, 264
Jaeger, H., phosphatizing, 69
Jafet, R. N., elected Member, 189
James, K. H., elected Associate, 190
Janco, N., dimensioning of risers, 61
Jäniche, W., and **K. H. Saul,** spark tests of steel, 172
Jarka, J., properties of bentonite, 61
Järvinen, K., Otanmäki ore, 371
Jarvis, E., elected Member, 189
Jaswon, M. A., and **J. A. Wheeler,** austenite–martensite transformation, 167
Jauncey, G. E. M., *Book*: "Modern Physics," 176
Jeffes, J. H. E. *See* Richardson, F. D.
Jeffrey, R., failure of mining gear, 386
Jeffries, J. U. *See* Chyneweth, W. R.
Jenkins, I., peeling of malleable cast iron, 18; sulphide penetration in steel, 19; *see also* Dovey, D. M.
Jenkinson, J. R. *See* Rylands, J. R.
Jepson, M. D., elected Associate, 190
Jerphanion, A. de. *See* de Jerphanion, A.
Jervis, J. L., zirconal refractories, 57
Jeschke, H., rock-drilling, 145
Johnson, E. S. *See* Miericke, K. A.
Johnson, H. H., and **G. A. Fisher,** statistical quality control, 62
Johnson, H. H., M. T. McDonough, and **D. L. Radford,** slag control in acid electric furnace, 59
Johnson, K. L. *See* Lucks, C. F.
Johnson, L. W., machinability of steel, 381
Johnson, S. C., corrosion in eucalypt sulphate pulp mills, 394
Johnson, W. A., belt conveyors, 361
Johnson, W. H., and **W. O. Baker,** gating of castings, 152
Johnston, D., elected Member, 189
Johnston, T. L., and **W. M. Mahan,** sponge iron, 255
Jolly, T., elected Member of Council, 283
Jolly, V. G., corrosion tests of painted specimens, 96
Joly, G., blueing of iron, 69; calculation of cupola charges, 59; cast iron heating plates, 75; cast iron pots for zinc melting, 377; castability of iron, 152; chilled castings, 61; chromium and nickel additions to cast iron, 59; cupola tuyeres, 59; desulphurization of iron, 152; effect of boron on hardenability of steel, 75; effect of chromium on graphitization of cast iron, 75; effect of manganese on annealing of malleable cast iron, 65; foundry mechanization, 63; malleablizing furnaces, 65, 376; non-magnetic nickel cast iron, 152; porosity in iron castings, 62; *see also* Simon, P.
Jones, J. E., elected Member, 189
Jones, J. H., *Booklet*: "Steel Industry and Nationalisation," 176; nationalization of steel industry, 174
Jones, R. M., elected Associate, 190
Jones, V. W., basic bricks for open-hearth furnaces, 147
Jones, W. D., sprayed enamel coatings, 96
Jordan, C. B. *See* Duwez, P.
Jordan, O., protective coatings, 394
Joyce, D., effect of coke quality on blast-furnace operation, 148; sulphur elimination in blast-furnace, 148
Judelsohn, F., flame descaming, 157
Juliard, A., R. Rayet, and **A. Ludé,** reduction of metallic oxides, 148
Julien, C. A. *See* Sheehan, J. P.
Juretzek, H., hot tears in steel castings, 258; shrinkage cavities in steel castings, 153
Jurich, H. and **W. Eilender,** nitrogen in converter steel, 255

Kahn, S. H., French iron and steel industry, 58
Kainarskii, I. S., dinas bricks, 147; silica bricks, 147
Kajma, J., and **H. Ishihara,** determination of sulphur in steel, 171
Kalynzhnaya, P. F. *See* Gratsianskii, N. N.
Kammerer, A., elastic modulus and fatigue limit, 269
Kamph, S. *See* Karlén, S. E.
Kantorovich, B. V., preheating of fuel, 55
Kaplin, S. M., steel scrap, 375
Karlén, S. E., and **S. Kamph,** ore transport, 145
Karmazin, V. I., and **B. I. Naugolnikov,** magnetic properties of ores, 54
Karnad, S. S., elected Member, 189
Karwat, E., oxygen plants, 373
Kaufman, G. A., adjustable voltage drives, 154
Kauko, Y., rust formation on iron, 274
Kautz, K., porcelain enamels, 70
Kayalov, G. M., heating of rolling mill motors, 154
Keel, C. G., oxy-acetylene welding, 156
Keeley, L. F., effect of elements on hardness of steel, 270; heat-treatment, 258
Keil, F., effect of heating granulated slags, 57
Kempson, J. T., elected Member, 189
Kenner, R., mechanical handling in foundries, 63
Kentischer, A., cupola practice, 59
Kenyon, A. F., electric driving of rolling mills, 154
Keohane, K. W., photomicrographs of hot surfaces, 76
Kerley, W. F. G., wire-drawing, 66
Kerverseau, E. de. *See* de Kerverseau, E.
Kesper, J., preparation of ore, 371
Keyser, C. C., welding in steel mills, 263
Khanin, S. E., testing machine, 268
Kidin, I. N., transformation in steel during H.F. heating, 64
Kidman, L., elected Member, 189
Kiefer, G. C., and **C. H. Sheridan,** effect of composition on stainless steels, 168
Kiefer, J. E., corrugated sheets, 154
Kilby, J. A., and **W. G. Cameron,** rolling mills, 261
Killeffer, D. H., *Book*: "Genius of Industrial Research," 400
Killington, A. J., elected Associate, 190
Kimmel, A. L., corrosion studies, 274
King, C. V., measuring metal dissolution rates, 169
Kirillov, P. G., diagrams of extension and compression, 386
Kirkpatrick, J. W., elected Member, 189
Kirkup, T., elected Member, 189
Kirkwood, A., elected Member, 189
Kiselev, S. T. *See* Arkhorov, V. I.
Kitchener, J. A. *See* Bockris, J. O'M.
Kitchener, J. A., and **J. O'M. Bockris,** temperature measurement, 146
Kitchener, J. A., J. O'M. Bockris, and **A. Liberman,** iron-sulphur ratio in iron, 148
Kitice, T., charcoal in moulding sand, 60
Klein, W. J., detection of carbon monoxide, 277
Kleine, K., management organization, 174
Klemm, H., determination of surface roughness, 264; thickness measurement or coatings, 264
Kling, F., steelworks costing, 79
Kling, F. E., ladles, 156
Klinger, P., and **W. Koch,** isolation of inclusions, 77
Kluck, W. A. *See* Poehlman, W. J.
Knappwost, A., measurement of viscosity 386
Kniaginin, G., cement-sand moulds, 377
Knickenberg, A., wear of metals, 73
Knight, L. B., small foundry modernization, 63
Knotek, M., manufacture of malleable cast-iron, 59
Koch, L. *See* Fenner, E.
Koch, W. *See* Klinger, P.
Koch. W., and **H. J. Wiester,** carbides in alloy steel, 391
Kocho, V. S., temperature measurement of liquid steel, 56
Koenig, W., paint coatings, 384

Koenigsberger, F., *Book*: "Design of Welding in Mechanical Engineering." 80
Kofler, F., and **G. Schefels,** gas flow in open-hearth furnaces, 256
Koh, P. K. *See* Gilman, J. J.
Köhler, W., gating of castings, 377
Kohlhaas, P. F., sheet mill of Columbia Steel Co., 380
Kohn, A. *See* Delbart, G.
Kootz, T., effect of converter shape on nitrogen in steel, 255
Kootz, T., and **W. Holtmann,** nitrogen in pig iron, 148
Kopecki, E. S., cupola metal for O.H. furnaces, 58, 149; O.H. fume control, 58
Kopecky, A., flame-hardening of crankshafts, 153
Koppe, H., heat economy, 55
Korenman, I. M., and **A. P. Rostokin,** capillary microburettes, 396
Korobov, N. I. *See* Korobova, M. I.
Korobova, M. I., and **N. I. Korobov,** catalytic agents in blast-furnace process, 373
Korolev, P. G., testing of piston rings, 268
Korovskii, Sh. Ya., fatigue of steel, 386
Korsun, M. M. *See* Babko, A. K.
Korzh, P. D., determination of sodium in clays, 278; *see also* Borovkov, V. V.; Kozlova, A. V.
Kostenetc, V. I., and **A. M. Ivanchenko,** properties of metals at low temperatures, 75
Kostetskii, B. I., and **P. K. Topekha,** microhardness, 162
Kozlova, A. V., and **P. D. Korzh,** determination of chromium in ferrochromium, 172
Kozma, J. L., restoration of carbon in decarburized surfaces, 153
Kraner, H. M., O.H.-furnace bottoms, 147
Kraus, R. A., lubrication, 262
Krause, H., porosity of metal coatings, 158
Kraut, F. *See* Caillère, S.
Kreml, J. F., electropolishing, 382
Krieger, R. J. *See* Chyneweth, W. R.
Krijff, A. P. *See* de Decker, H. C. J.
Kristufek, F. C. *See* Rickett, R. L.
Krolevets, S. M. *See* Bondarenko, M. M.
Kroy, W., welding automobile axles, 66
Kruglova, E. G. *See* Fedot'ev, N. P.
Kruzhevnikova, A. I. *See* Finkelshtein, D. N.
Kudriavcev, D. L. *See* Grigoriev, A. T.
Kudryavtsev, I. V., testing machine, 385
Kufferath, A., electrodeposition of cobalt, 383
Kuivenen, T. O. *See* Hardy, H. M.
Kuka, K. S., control of power loads, 155
Kukanov, L. I., fatigue of spring steel, 162
Kunert, A., conventional signs for welded joints, 66
Kurek, F., razor blades, 264
Küster, J. H., German foundry coke, 59
Kuz'min, L. L., and **L. V. Borisova,** powder-iron welding electrodes, 262
Kvitka S. S., *See* Umanskii, M. M.

Labrie, A., gas cutting of stainless steel, 381
Lacombe, P. *See* Bénard, J.
Laffineur, M., microphotometer, 275
Lahr, G. M., hardening of cylinder liners, 164
Laidler, gas carburizing plant, 153
Lainé, J., annealing of malleable cast iron, 152
Laison, E., Lorraine coking coal, 55
Lake, G. W., power requirements of belt conveyors, 362
Lamb, G. B., salt baths, 378
Lamberg, A. B., fatigue of steel, 269
Lamont, J. L. *See* Crafts, W.
Lanari, R., elected Member, 189
Lander, J. J., and **L. H. Germer,** deposition of metals by pyrolysis, 159
Landergren, S., Swedish iron ore, 253
Langhammer, A. J., metal powder bearings, 262
Lankford, W. T. *See* Jackson, L. R.
Lanskaya, K. A. *See* Gintsburg, Ya. S.
La Pante, R. J. *See* Chyneweth, W. R.
Lapin, V. V. *See* Belyankin, D. S.
Laplanche, H., defects in malleable cast iron, 62; structure diagrams for cast iron, 77
Lardge, H. E., deep drawing and pressing of gas-turbine-engine parts, 65
Larsen, B. M. *See* Brower, T. E.
Larsen, R. G. *See* Barnum, E. R.
Larson, C. M., cutting oils, 157
Larson, M. R. *See* Bayer, E. C.
Larson, T. E., corrosion of turbine pumps, 167
Laskho, N. F., strains in twisted bars, 269
Lassieur, A., precision in analysis, 395
Lastra y Soubrier, R. de la. *See* de la Lastra y Soubrier, R.
Latter, A. J. *See* Dorn, J. E.
Lattre, P. de. *See* de Lattre, P.
Laue, K., mandrels for tube presses, 154
Lawson, H. *See* Daschke, G. F.
Lay, J. O., elected Member, 189
Layland, R. A., elected associate, 190
Layner, V. I., *Book*: "Electrolytic Polishing," 280
Le Bailly, L. E. S. H., elected Member, 189
Lebedev, T. A., and **V. M. Guterman,** electric charge of carbon particles in gamma iron, 270
Leckie-Ewing, P., heat-treatment of high-speed steel, 378
Lee, B. R., R. Meadows, jun., and **W. F. Taylor,** photoelectric laboratory, 386
Lee, R. L., costing, 79
Lees, D. C. G., heat treatment of automobile parts, 64
Lement, B. S., B. L. Averbach, and **M. Cohen,** dimensional stability of tool steels 166
Lendl, A. E., spread in rolling bars, 380
Léonard, J., foundry developments, 173
Leonard, L. G. A., annealing furnaces for sheets, 65
Leonov, K. F., blast-furnace linings, 147
Leroy, A. *See* Chamagne, L.
Leroy, M. A., resistance welding, 262
Lesage, R., cupola charging, 59; mechanization of foundries, 62
Leslie, W. C., and **M. G. Fontana,** oxidation of molybdenum alloys, 170
Letova, V. K. *See* Taits, E. M.
Leusink, H., moulding machines, 152
Leve, N. F., and **S. S. Sandomirskaya,** determination of inclusions, 277
Leven, M. M., photoelasticity, 385
Lewis, E., Australian steel industry, 278
Lewis, H. E., controlled atmosphere, 153
Lewis, K. G., effect of composition, manufacture and defects in steel on working of hollow billets, 65; *see also* Bishop, T.
L'hermitte, A. L., rolling of angles, 155
Liberman, A. *See* Kitchener, J. A.
Liberthson, L., effect of sulphur bacteria on corrosion, 168
Libsch, J. F., induction hardening, 259
Libsch, J. F., and **R. D. Guess,** selective hardening, 64
Lietzke, M. H., and **M. L. Holt,** electrodeposition of iron–tungsten alloys, 383
Liger, J., adherence of electrodeposits, 265; cleaning surfaces for electrodeposition, 67; hard chromium deposits, 68; passivity of metals, 68
Light, J. O., elected Member, 189; *see also* Wilder, A. B.
Linebrink, O. L. *See* Lucks, C. F.
Linnert, G. E., weldability of alloys, 66
Linnett, J. W. *See* Sherratt, S.
Linsley, H. E., painting of metals, 266
Linstead, C. C., elected Member, 189
Linstead, R. P., corrosion of pipes, 168
Linville, T. M. *See* Crever, F. E.
Lippert, T. W., continous casting of steel, 59
Lipson, C. H. *See* Moncher, F. L.
Lisle, E. B., elected Member, 189
Lissner, H. R. *See* Moncher, F. L.
Littlewood, G., elected Associate, 190
Lloyd, T. E., welding electrodes, 156
Lobenstein, A. *See* Meybeck, J.
Loewy, F. J., powdered metal friction material, 267
Logan, K. H., corrosion of cast-iron pipe, 395
Lögters, H., iron ore in Poland, 371
Lolley, J., elected Associate, 190
Long, E. A., elected Associate, 190
Longenecker, C., basic refractories, 254; plant of Basic Refractories Inc., 56
Lood, R. C. *See* Harrison, G. R.
Loofbourow, J. R. *See* Harrison, G. R.
Loon, J. Van. *See* Van Loon, J.
Looney, J. A., metal spraying, 384
Loria, E. A. *See* Shephard, H. D.
Loria, E. A., and **H. D. Shephard,** defects in ingots, 151
Loshkarev, V. F., deformation under impact, 385
Lotz, P. L., paint, 266
Love, R. J., cast crankshafts, 165
Lovell, F., die inserts, 65
Low, S. *See* Malcolm, V. T.
Löwegren, G., *Book*: "Der svenska järnhanteringen genom tiderna," 409
Loxton, R. D., elected Member, 189
Lozinskii, M. G., H.F. heating of steel, 64
Lücke, K., and **G. Masing,** recrystallization, 391
Lucks, C. F., O. L. Linebrink, and **K. L. Johnson,** thermal conductivity of foundry sands, 60
Ludé, A. *See* Juliard, A.
Ludwig, N., effect of sheet thickness on tests of butt welds, 263; *see also* Siebel, E.
Lukashevich-Duvanova, Iu. T., sulphides in carbon steel, 276
Lukin, B. V., X-ray diffraction photography, 74
Lundy, A. S., dust collectors, 62
Lunt, G. T., obituary notice, 369
Lure, Iu. Iu. *See* Ginsburg, L. B.
Lynch, C., Australian iron and steel industry, 255
Lyons, O. R., and **A. C. Richardson,** drying of coal, 254
Lyubavskii, K. V., sulphur reaction and hot cracking during welding of steel, 262

McAdam, D. J, jun., G. W. Geil, and **F. J. Cromwell,** properties of chromium steel at low temperatures, 273
McAfee, J., effect of alloy elements in heat treatment of steel, 63
McAuley, T. W., welding in steel mills, 263
McBrian, R., cracking of boiler shells at riveted seams, 394
McCann, G. D., lightning protection of electric power systems, 155
McClatchey, H. E., temperature control, 254
McClenahan, W. T., corrosion and protection of steel, 394
McCormick, G. C., load-carrying grid for heat-treatment furnace, 377
McCrady, D. C., and **W. J. Shortall,** electrical control for strip mill, 155
MacCullough, G. H. *See* Timoshenko, S.
McCutcheon, D. M., non-destructive testing, 70
McDaniel, B. H., sludge removal from water cooling plants, 255
MacDonald, F. P. *See* Sudrabin, L. P.
McDonald, H. J. *See* Dravinieks, A.; Marsh, G. A.
MacDonald, N. D., elected Member, 189
McDonough, M. T. *See* Johnson, H. H.
McElwee, R. G., grey cast iron, 272
Macfarlane, T. G., elected Associate, 190

MacGregor, C. W., and **R. B. Palme,** stresses in rolling, 154
Machu, W., *Book* : " Metallische Ueberzüge, 280
McIntyre, H. D. *See* Udy, M. C.
McKee, J. H., powder particle cohesion, 160
McKeown, J., and **L. H. Back,** fatigue testing machine, 162
McKinney, R., elected Member, 189
MacMillan, J. A., elected Member, 189
McMullen, J. *See* Monks, J. A.
Macnair, P. M., structures of ingots, 151
Macnair, R., cleaning metals for electrodeposition, 67
MacQueen, A. J. F., cranes, 156
McWilliam, J. A., corrosion-resisting steels for textile works, 76 ; stainless steel for chemical and food industries, 173
Madsen, I. E., cranes, 261
Magers, W. W., moulding sands, 257
Magis, S. F., surface preparation of tool steel, 157
Magnel, G., creep of steel, 74
Mahan, W. M. *See* Johnston, T. L.
Maheu, P. *See* Dumas, M.
Mahl, H., electron micrographs of fractures, 165
Mahla, E. M., and **N. A. Nielsen,** electron microscope in corrosion studies, 169
Makkov, V. N., fatigue of axle steel, 161
Malcom, V. T., and **S. Low,** properties of alloy steel at high temperatures, 273
Malinkovich, A. N., and **I. M. Roitman,** temp. coeff. of modulus of elasticity of sheet on bending, 71
Malmberg, G., effect of specimen shape in tensile test, 161
Maltsev, V. F., and **V. Ya. Sych,** determination of silicon, phosphorus, manganese, chromium and nickel in steel, 172
Mamykin, P. S., disintegration of open-hearth furnace bottom, 373
Manders, T. J. J., infra-red drying, 70
Manevich, Sh. S., elastic after-effect in metals, 161 ; hardness tester for sheets, 269
Mangin, A., pickling, 264
Mankowich, A., throwing power of plating solutions, 382
Manley, R. G., *Book* : " Fundamentals of Vibration Study," 399
Mann, W., corrosion, 78
Mansell, R., electrodeposition of zinc, 383 ; pretreatment of galvanized iron prior to painting, 267 ; shot peening, 381
Mantel, W. *See* Hofmeister, B.
Mantel, W., and **E. Hülsbruch,** gasification of coke, 56
Mantle, J. B., and **T. J. Dolan,** photoelasticity, 386
Mardon, H. H., biographical note, 367
Mardon, H. H., and **J. S. Terrington,** *Paper* : " The Layout of Integrated Iron and Steel Works," 327
Maré, E. de. *See* de Maré, E.
Marek, R., thawing out pipelines by welding equipment, 399
Markova, N. E. *See* Novokreshchenov, P. D.
Marks, A. W. *See* Hovis, A. L.
Marle, F., nationalization of industries in Czechoslovakia, 174
Marlin, D. H. *See* Rush, R. M.
Marmach, M., chromizing, 383
Marsh, G. A., and **H. J. McDonald,** corrosion rates, 169
Marsh, J. S., oxygen-enriched air for O.H. furnaces, 58
Marshall, D. F., biographical note, 366
Marshall, D. F., and **H. C. White,** *Paper* : " The Conversion to Oil Firing of the Open-Hearth Furnaces at Park Gate Works," 301
Marshall, J. R., Belgian coking practice, 254
Marshall, R. P., electroplating, 382
Marshall, W. B., elected Member, 189
Martin, E. D., pickling of strip, 157
Martin, G. S., awarded Ablett Prize, 284, 365
Martindale, R. G., magnetostriction and permeability of silicon steel, 74
Martinez, S. J. *See* Cardwell, P. H.
Marzecki, B., rolling-mill bearings, 380
Marzke, O. T., elected Member, 189
Mashovec, V. P., and **A. P. Obhukov,** cleaning of wire for safety glass, 67
Mashtokova, L. D. *See* Gudtsov, N. T.
Masing, G. *See* Lücke, K.
Maslov, E. N., scratching of metals, 157
Mattes, H. L. *See* Sweeney, W. O.
Matteson, E. A., galvanizing of strip, 159
Matthaes, K., magnetic-induction testing, 162
Mattiello, J., organic coatings, 69
Matuschka, B., ingot and ingot-mould heat equilibrium, 59
Maubeuge, P. L., iron ore in Lorraine, 54
Maurakh, A. A., dry distillation of fuel, 146
May, K., sintering of metal powders, 267
Mayne, J. E. O., corrosion of painted metals, 94
Mayne, J. E. O., and **R. S. Thornhill,** *Paper* : " Cementiferous Paints. *Discussion*, 100
Meadows, R, jun. *See* Lee, B. R.
Mears, R. B., and **S. C. Snyder,** properties of steel, 389
Medcalf, C. M., inspection of heat-treated parts, 73
Medshibozhsky, M. Y., O.H. furnace slag sampling, 58
Mehaffy, W. R., J. N. Van Scoyoc, and **D. S. Schover,** amplifier for strain gauge measurements, 386
Mehl, R. F. *See* Wells, C.
Mehnert, K., corrosion-resistance of lacquer coatings, 394
Meijering, J. L., internal oxidation in alloys, 169
Meinhart, W. L. *See* Ziegler, N. A.
Meites, L., polarographic determination of iron, 275
Melchior, P. *See* Siebel, E.
Mendel, L., *Book* " Pour le Soudeur au Chalumeau et le Decouper," 400
Mente, P. C., *Book* : " Stanzen en Dieptrekken," 400
Menzies, J. A., elected Associate, 190
Merchant, M. E., and **N. Zlatin,** free-cutting steel, 263
Merlijn, J., diamonds for grinding, 157
Meshel, B. S., heating-up schedules for electric furnaces, 63
Metcalfe, K. A., radiography, 388
Methley, B. W., obituary notice, 370
Meybeck, J., N. Iwanow, and **A. Loebenstein,** corrosion of metals in sodium chlorite liquors, 394
Meynell, E., elected Member, 189
Meyrick, T. G. *See* Short, C. W.
Michel, A., austenite transformations, 166 ; special steel, 390.
Michell, D., and **G. W. West,** electronics, 74
Michie, P., elected Member, 189
Michler, K. W., tool steels for cold forging, 65
Micksch, J. E., H. A. Fabert, jun., and **G. M. Cover,** effect of boron in malleable cast iron, 271
Miericke, K. A., and **E. S. Johnson,** plaster moulds, 61
Mikhalchuk, B. V. *See* Amelin, A. G.
Mikheev, M. N., P. N. Zhukova, and **A. P. Voroshilova,** heat treatment of alloy steel, 259
Miklowitz, J., effect of specimen size in tensile tests, 72
Mikulinsky, S. S., electric smelting furnaces, 256
Milburn, L. R. *See* Mosteller, W. A.
Miller, A. J. *See* Brophy, G. R.
Miller, E. T., carbide dies, 260
Miller, G. L., metal powders, 267
Miller, G. W. *See* Boner, C. J.
Miller, J., and **G. Guarnieri,** tensile tests at high temperatures, 388
Miller, W. E., electrical equipment of strip mills, 154
Millett, W. H., lubricants, 66
Mills, J. F. *See* Gardam, G. E.
Milovanova, N. V. *See* Stromberg, A. G.
Mirando, A., elected Member, 189
Mitchell, A. D., *Book* : " British Chemical Nomenclature," 280
Mitchell, J. F. R., elected Member, 189
Mitchell, R. G., elected Member, 189
Mitinkskii, A. N., and **E. S. Reinberg,** tests of protective value of coatings, 266
Mitra, H. K., and **J. C. Banerjee,** Indian refractores, 147
Mitra, H. K., and **T. W. Talwalker,** Indian refractories, 147
Mohler, J. B., electroplating of metals, 265
Mohler, J. B., and **H. J. Sedusky,** analysis of plating baths, 398
Monaghan, J., slag control in steel making 373 ; *see also* Smith, W. A.
Moncher, F. L., H. R. Lissner, and **C. H. Lipson,** strain gauge measurements of reinforcing rods, 386
Mond, T. C. du. *See* du Mond, T. C.
Monks, J. A. *See* Tucker, H. J.
Monks, J. A., and **J. McMullen,** Efco-Virgo descaling process, 157
Moon, A. Ramsay, *Book* : " Design of Welded Steel Structures," 80
Moore, G. A. *See* Sims, C. E.
Moore, J., elected Member, 189
Moore, J. H., heat treatment of nickel–chromium–molybdenum steel, 378
Moreau, Marthe. *See* Guérin, H.
Morgan, J. R. *See* Tarnopol, L.
Mortiz, H., polarographic analysis, 275
Morley, A. D., elected Member, 189
Morris, A. H. *See* Voder, J. D.
Morrogh, H., peeling of malleable cast iron, 22
Morrow, F. M., and **K. Oganowski,** continuous coating, 158
Morse, L. M. *See* Heussner, C. E.
Mort, J. H., electrotinning of strip 266 ; pickling of sheets, 264
Mörtsell, S., and **P. V. Villner,** screening, 372
Moss, J. F. C., elected Member, 189
Mosteller, W. A., and **L. R. Milburn** mixers, 149
Mouton, B. J., weldability of steel, 263
Mravek, J. G., inclusions in steel, 374
Mucke, H., gauges for wire-drawing dies, 380
Mueller, J., design of forging dies, 260
Muhlenbruch, C. W., ladle hooks, 156
Mukhina, Z. S., determination of manganese, molybdenum and nickel, 276
Mulcahy, B. P., blast variations in cupolas, 257
Mund, A., American steelmaking practice 373
Muntz, C. D., elected Member, 189
Muracheva, V. J. *See* Tananaev, N. A.
Murad, A. B., elected Associate, 190
Murray, P., and **J. White,** constitution of slags, 151
Mutis, V., iron ore in Colombia, 371
Myers, O. J., foundry-sand laboratories, 60
Myers, W. R., and **B. DeLong,** corrosion of metals by fluorine, 274
Naeser, G., oxide film theory, 149
Naeser, G., H. Steffe, and **W. Scholz,** production of iron powder, 160
Nag, S. K., elected Member, 189
Naghaudhuri, S., elected Associate, 190
Narayanan, P. I. A., beneficiation of chromite, 372
Naugolnikov, B. I. *See* Karmazin, V. I.
Naujoks, W., forging practice, 259
Nava, A. *See* Filippi, F.
Neary, J., jacking-up blast-furnace, 255
Nedviga, P. Ya, gas interferometer, 172
Néel, L., magnetism, 387
Neff, J. M., heat-resistant ceramics, 160
Nehrenberg, A. E. *See* Payson, P.

Nekervis, R. J., and **R. M. Evans,** lubricant for cold rolling, 380
Neumann, G., furnace roofs, 149
Nevis, G. *See* Olson, W.
Newell, W. C., oxygen-enriched air for converters, 150
Nicholls, W. *See* Beeching, R.
Nickols, D. G., vacuum furnace, 273
Nicolas, P., dried moulding sands, 152; foundry facings, 60; foundry sands, 60; Marseilles foundry sands, 60; tests of refractory linings, 57
Nielsen, N. A. *See* Mahla, E. M.
Niemeyer, H., materials for turbines, 272
Niesen, H., tests of lacquered sheets, 383
Nijhawan, B. R., failure of railway material, 386
Nikitina, E. I., determination of arsenic, 397
Noble, R. E., elected Associate, 190
Noe, F. E., sintering, 372
Nolen, W. A. J., welding manipulators, 381
Nooyen, P. van. *See* van Nooyen, P.
Norén, T., welding of stainless steel, 156
Norguet, R., foundry mechanization, 62
Norris, F. G., and **E. B. Hughes,** direct oxidation in O.H. basic furnace, 149
Novokreshchenov, P. D., and **N. E. Markova,** twisting of small samples, 71
Nunn, P. H., elected Associate, 190
Nurse, T. J. *See* Wormwell, F.
Nussbaum, A. I., awarded Mond Nickel Fellowship, 284; Sendzimir mill, 261; strip mill, 380; uni-temper mill, 261

Oberti, G., study of stresses, 161
Obukhov, A. P. *See* Mashovec, V. P.
Oding, I. A., properties of metal at high temperature, 388
Oehler, A., electric furnaces, 256
Oehler, G., "Simultan" deep-drawing process, 379
Oganowski, K. *See* Morrow, F. M.
Ogawa, K., powder metallurgy, 384
O'Hagan, R. S., heat treatment, 258
Ohlsson, O., determination of moisture in coal, 278
Old, B. S., and **E. R. Poor,** pressure blowing of blast furnaces, 57
Oliver, D. A., and **D. Hadfield,** permanent magnet materials, 387
Oliver, T. O., jun., repair of castings, 258
Olson, W., and **G. Nevis,** martempering, 63
Olt, T. F., annealing of sheet and strip, 154
Ongaro, M., high-speed steel, 273
Orosco, E., flakes in high-speed steel, 390
Orowan, E. *See* Paterson, M. S.
Orr, C. W., electron theory of metals, 387
Orsag, J., spectrographic analysis, 275
Osborn, O. *See* Wahlquist, K. D.
Osborne, D. G., elected Associate, 190
Osborne, S. G., and **H. R. Spence,** descaling in salt baths, 382
Osgerby, W. E., elected Member, 189
Osmond, F., work of, 173
Osswald, E., determination of stresses, 163
Ottey, H. A., pressing of steel parts, 379

Padbury, H. F., elected Hon. Member of Council, 283
Païdassi, J., crystallography of iron, 173
Palit, K. L., elected Associate, 190
Pallister, P. R., *Paper*: "The Specific Heat and Resistivity of High-Purity Iron up to 1250° C., 87; biographical note, 141
Pallo, P. E., cathodic protection of water tanks, 393
Palme, R. B. *See* MacGregor, C. W.
Palmer, T. J., bronze-welding of cast iron, 67; repair of worn hammers, 157
Panchenko, I. D. *See* Skobets, E. M.
Parish, H., elected Member, 189
Park, L. H., resistance welding, 381
Parker, C. M., handling materials, 156
Parker, E. R. *See* Davis, H. E.
Parry, P. I., elected Associate, 190
Pascal, T., strickle moulding, 61
Paschkis, V., freezing rates of white cast iron, 62; heat problems in steel industry, 258; solidification of steel spheres, 62
Pashkov, P. O., irregular deformed states, 161
Paterson, M. S., and **E. Orowan,** X-ray line broadening in cold-worked metals, 271
Pattantyus-Ábráhám, I., Hungarian foundry practice, 173
Patterson, C. *See* Brown, H.
Patterson, W. R., and **J. T. Evans,** single slag basic electric furnace practice, 58
Pattinson, M., elected Associate, 190
Pauling, L., and **A. M. Soldate,** iron silicide, 167
Pavlinova, A. V., determination of trivalent iron, 171
Pavlov, M. A., life and work, 173
Payne, F. E., roll neck seals, 261
Payson, P., and **A. E. Nehrenberg,** alloy steels, 165; high-strength steel, 164
Peacock, A. G., instruments shown at Physical Society's Exhibition, 76
Peacock, F. B., elected Associate, 190
Peace, A. E., peeling of malleable cast iron, 17
Pealer, G. A., foundry patterns, 152
Pearce, J. G., acicular cast iron, 272; British Cast Iron Research Association's activities, 152
Pears, G. R. W., elected Member, 189
Pearson, J., and **W. Bullough,** porosity test for tinplate, 266
Peifer, N. P., and **F. E. Costanzo,** cathodic protection of pipe lines, 275; galvanic currents in underground structures, 169
Pellinets, V. S. *See* Firdman, R. A.
Pennington, W. A., decarburization of steel with mill scale, 377
Perchat, H., mechanization in sand preparation, 60
Percy, J. W., measurement of heating rates, 254
Pereira Pinto, F. F., elected Member, 189
Pessi, P., protective paints, 267
Pethebridge, J. M., tool steel, 76
Petit, D., Cowper stove, 147
Petrenko, I. G. *See* Agroskin, A. A.
Petrosyan, P. P., stabilization of undercooled austenite, 274
Petrov, G. V., corrosion of hydraulic equipment, 168
Petterson, H., and **S. Eketorp,** basic open-hearth slags, 374
Pfaff, E. I., lubrication, 262
Phebus, R. L. *See* Zapffe, C. A.
Philippidis, A. H., maximum plastic resistance, 71
Phillips, D. L., crystals in pure iron, 77
Philosophical Magazine, commemoration number, 399
Piaskowski, J., electropolishing, 391
Pieters, H. A. J., W. J. Hanssen, and **J. J. Geurts,** colorimetric determination of nickel, manganese and chromium in steel, 276
Pietsch, H. A. *See* Rush, R. M.
Pigott, E. C., determination of hydrogen, nitrogen and oxygen in ferrous metals, 172; metallurgical analysis, 395
Pilz, H. *See* Wickert, K.
Pinner, W. L., polishing of steel, 68
Piper, R. W., oil emulsion for strip rolling, 262
Piret, N., power requirements for drawing wire, 154
Pišek, F., work of M. A. Pavlov, 173
Pishikov, G. P., G. T. Aleinchenko, and **N. S. Alferova,** stainless steel pipes, 154
Piwowarsky, E., manufacture of cast iron, 75; phosphorus in cast iron, 271; reinforced cast iron, 272
Pizzo, M. *See* Drigo, A.
Platts, F. A., elected Member, 189
Pluut, J. M. *See* de Decker, H. C. J.
Podkorytov, B. K., determination of carbon, 397; silicon carbide furnace, 396
Podzolova, E. C. *See* Voronin, N. I.
Poehlman, W. J., and **W. A. Kluck,** spectroscopy and X-ray diffraction, 397
Pokorný, A., spectrum analysis, 397
Polakowski, N. H., awarded Carnegie Research Grant, 284
Pollack, sodium sulphate nickel plating baths, 69
Polle, S. W., deoxidation in electric furnace practice, 374
Pollock, W. A. *See* Dombrook, F. L.
Poluboyarinov, D. N., and **R. Ya. Popil'skii,** high-alumina refractories, 146
Polyakov, A. Yu. *See* Samarin, A. M.
Pomey, J., and **M. Chateau,** gaseous carburization, 259
Pompei, L., blast-furnace lining, 57
Pontielli, R., electrochemical properties of metals, 70
Poole, H. W., electrical equipment of Sendzimir mill, 154
Poor, E. R. *See* Old, B. S.
Popil'skii, R. Ya. *See* Poluboyarinov, D. N.
Popov, M. A., determination of molybdenum, 171
Porter, C. S., elected Member, 189
Porter, F. C., elected Associate, 190
Portevin, A., selection of metals for specific purposes, 173
Posselt, E. J., plugging of motors, 156
Postle, J., elected Member, 189
Postlethwaite, A. W., awarded Carnegie Scholarship, 284
Potaszkin, R. *See* Delbart, G.
Potter, G. M., and **K. C. Dean,** concentration of manganese ore, 253
Potter, R. K. *See* Wishart, H. B.
Pourbaix, M., thermodynamics in corrosion studies, 78
Pourbaix, M. J. N., and **C. M. Rorive-Bonte,** metallurgical equilibria, 150
Powell, C. E., hydraulic equipment, 155
Powell, E. M., *See* Dombrook, F. L.
Prachě, J., tests on cast iron, 75
Prager, W., stress-strain laws of plasticity, 71
Prause, H., mining Salzgitter ores, 145
Pray, W. F., control systems for fuel handling, 56
Preece, A., awarded Hadfield medal, 284
Preece, A., and **K. J. Irvine.** *Paper*: "Formation of Peel on Whiteheart Malleable Cast Iron. *Discussion*, 17; *Paper*: "Sulphide Penetration in the Carburization of Steel." *Discussion*, 17
Preisler, J. J. *See* Ashkinazy, S. B.
Preston, R. St. J., atmospheric-corrosion test, 167
Price, E. G., Bessemer practice for tubes, 256
Pristl, F., increasing production, 79
Pritchard, C. E., lubrication, 66
Probst, A. E., peeling of malleable cast iron, 20; *see also* Webster, G. R.
Progrevinskaya, M. L. *See* Babushkin, S. A.
Pruger, T. A., microscopic examination of stainless steel, 391
Pufahl, H. R., elected Member, 189
Purdie, W. R., elected Member, 189
Pyefinch, K. A., *Paper*: "Marine Exposures of Cementiferous Painting Schemes." *Discussion*, 100; *see also* Barnes, H.; Bishop, M. W. H.

Queern, B. J., pickling liquor disposal, 158
Quigley, J. M., elected Associate, 190

Rabaté, H., toxins in antifouling paints, 70
Radcliffe, S. V., elected Associate, 190
Radeker, W. *See* Simoneit, K.
Radford, D. L. *See* Johnson, H. H.
Ragg, M., corrosion of iron, 167
Raible, G. J., planing cast iron, 264

Ramalho, J., manufacture of manganese steel, 374
Rankin, J., W. H. Bailey, and **F. P. Stanton,** resistance-strain gauges, 261
Rankin, W. A., composition bearings, 154
Ranney, N. J., tension control in wire drawing, 260
Ranque, G., inclusions in steel, 376
Rao, T. N., elected Member, 189
Ratner, S. I., and **I. I. Zakharov,** increase of fatigue limit by cold-working, 269
Raudebaugh, R. J. *See* Eisenberg, R.
Rauzin, Ya. R., and **Sh. R. Zheleznyakova,** magnetic control of structure of tempered steel, 73
Rayet, R. *See* Juliard, A.
Ré, V. L., *See* Barros, C. R.
Reagan, W. J. *See* Wright, C. C.
Reebel, D., pickling of wire, 382
Reed, A. L., elected Associate, 190
Reed, F. H., German coking practice, 372
Reed, F. H., H. W. Jackman, O. W. Rees, G. R. Yohe, and **P. W. Henline,** coke production with Illinois coal, 55
Reed, R. L., corrosion of boilers, 79
Reed, W. S., elected Member, 189
Rees, O. W. *See* Reed, F. H.
Rees, W. P. *See* Gifkius, R. C.
Reese, D. J. *See* Schneidewind, R.
Reeve, L., defects in ingots, 151
Rehder, J. E., effect of Mn–S ratio on annealing rate of malleable cast iron, 59
Reichert, W. G., defects in castings, 62
Reif, A. E., density of coke, 146
Reinberg, E. S. *See* Mitinkskii, A. N.
Reiner, M. *See* Freudenthal, A. M.
Reinfeld, H., ferro-manganese, 256
Reininger, H., gating of castings, 61, 152; melting scrap in cupolas, 57; metal-spraying pistols, 159
Remy, M., transverse structure of steel, 151
Renouard, M., induction heating, 376
Retty, J. A., iron ore in Labrador, 371
Reuschle, W., *Book*: "Schmierung," 400
Rey, M., thermodynamic activity of silica and oxide in silicate melts, 151
Reymond, E., iron ore in Colombia, 371
Reynolds, D. A. *See* Brewer, R. E.
Reynolds, E. E., J. W. Freeman, and **A. E. White,** steel for gas turbines, 389
Rhoades, R. C., manufacture of bolts and nuts, 260
Richards, E. T., removal of coatings from scrap, 399
Richards, I., corrosion of steel, 274
Richards, M., elected Member, 189
Richardson, A. C. *See* Lyons, O. R.
Richardson, F. D., constitution of slags, 150
Richardson, F. D., and **J. H. E. Jeffes,** *Paper*: "The Thermodynamics of Substances of Interest in Iron and Steel Making," 150. *Corrigendum*, 229
Richardson, H. M. *See* Rigby, G. R.
Richelson, M., materials for jet pumps, 167
Rickett, R. L., and **F. C. Kristufek,** microstructure of low-carbon steel, 165
Riddihough, M., hardfacing, 262, 384
Ridgewell, P., elected Member, 189
Ridley, A. H., elected Member, 189
Ridsdale, J. H., blast-furnace plant, 255
Rieger, O., long-distance gas, 56
Rigaut, P., knocking-out of castings, 61
Rigby, G. R., *Paper*: "Investigations Relating to Scaffolds in Blast Furnaces," 295. *Appendix*: "Examination of a Scaffolding at the Shelton Iron and Steel Co. By G. R. Rigby and H. M. Richardson," 300; biographical note, 367
Rigby, T., moulding of turbine ca ing, 152
Rightmire, B. G. *See* Sakmann, B. W.
Riley, R. V. *See* Hurst, J. E.
Ripling, E. J., and **L. J. Ebert,** steel forgings, 76
Ritchie, J. G., heat treatment of high-speed steel, 63
Roberts, G. A., tool steel, 390
Roberts, J., coal carbonization, 372
Roberts, J. A., design of springs, 390
Roberts, T. G., elected Member, 189
Robertson, F. L., O.H. instruments sub-committee report, 58
Robertson, T., elected Member, 189
Robinson, E. L., alloy steels for pipes, 271
Robinson, R. *See* Gilbertson, T.
Robinson, T. W., obituary notice, 369
Roca Soler, J., elected Member, 189
Rocquet, P. *See* Halut, R.
Roddan, M., fuel oil in iron and steel furnaces, 56
Rodgers, H. C., tinning, 159
Roehl, E. J., nickel deposits, 265
Roesch, K., high-strength cast steels, 76; hot-blast cupolas, 257; moulding-sand compressibility, 60
Rogers, E., O.H. furnace instrumentation, 58
Rogers, R. R., accelerated corrosion testing of coatings, 78
Roitman, I. M. *See* Fridman, Ya. B.; Malinkovich, A. N.
Roitman, I. M., and **Ya. B. Fridman,** bending effect in torsion testing, 161
Roma, F., and **D. Sandulli,** heating open-hearth furnaces, 149
Ronnie, E. J., determination of molybdenum, 171
Rood, R. M. *See* Daniels, F. W.
Rooney, T. E., determination of oxygen in manganese–molybdenum steel, 277; determination of oxygen in nickel–chromium steel, 277; distribution of inclusions in billets, 278
Roper, S. P. *See* Astbury, N. F.
Rorive-Bonte, C. M. *See* Pourbaix, M. J. N.
Roš, M., fatigue of welds, 381
Rose, K., aircraft propellers, 154; shot-blasting, 381
Rosen, E. *See* Black, G.
Rosen, E., and **G. Black,** chromizing, 383
Rosenberg, S. J., and **J. H. Darr,** stabilization of stainless steel, 392
Rosenqvist, T., sulphur distribution between metal and slag, 374
Rostokin, A. P. *See* Korenman, I. M.
Rothenthaler, N. E., rolling of strip, 261
Rowden, E., fuels for refractory industry, 57
Rowland, E. S. *See* Bassett, J. B.
Royal Canadian Institute, centennial volume, 400
Royal Society. *Book*: "Empire Scientific Conference," 280
Rozengart, M. I., mercury-sealed bulbs for gas analysis, 398
Rozet, D., H. C. Campbell, and **R. D. Thomas, jun.,** effect of weld metal composition on welds, 263, 381
Rudolph, W., galvanizing, 69
Rudulph, E. A., corrosion by flue gases, 395
Rühl, K., testing machines, 70; *see also* Siebel, E.
Ruhnke, D. H., elected Member, 189
Ruhnke, D. H., E. T. Walton, and **P. R. Wray,** hardenability band specifications, 270
Rummel, K., power costs, 80
Rush, R. M., H. A. Pietsch, and **D. H. Marlin,** die heater, 175
Rutenburg, E. B. *See* Charova, A. M.
Ryabokon, V. D. *See* Skobets, E. M.
Ryan, A. P., and **F. E. Ackley,** continuous electric heating of strip, 63
Rybalko, F. P., and **M. V. Yakutovich,** dynamometer, 161
Rylands, G. K., and **A. E. Sykes,** wire-drawing in Warrington District, 260
Rylands, J. R., and **J. R. Jenkinson,** corrosion of boiler plates, 392

Sakmann, B. W., and **B. G. Rightmire,** fretting corrosion under oxidation, 169
Salathe, E. N., corrosion of condenser equipment, 274
Salt, F. W., *Paper*: "Examination of the Bendix Method for Determining Coating Thickness on Tinplate," 118
Samarin, A. M., A. Yu. Polyakov, and **L. A. Shvartsman,** composition of oxidizing slag in arc furnaces, 374
Samarin, A. M., and **L. A. Shvartsman,** combustion of manganese, silicon and sulphur in molten iron, 256
Sandell, W. G., and **D. T. Holmes,** concentration of manganese ore, 253
Sanders, C. A., moulding sands, 258
Sanderson, J. A., biographical note, 249
Sanderson, J. A., and **J. G. Frith,** *Paper*: "A Review of the Application and Design of Heavy Forging Presses," 231
Sanderson, L., die steels, 65; heat treatment of stainless steel in salt baths, 258
Sandilands, W. A., elected Associate, 190
Sandomirskaya, S. S. *See* Leve, N. F.
Sandulli, D. *See* Roma, F.
Sarmiento, R. *See* Alvarado, B.
Saul, K. H. *See* Jäniche, W.
Saut, R. W. van. *See* van Saut, R. W.
Savage, J., transformations in iron, 78
Savage, L. H. W., biography, 141
Savage, L. H. W., and **A. V. Brancker,** *Paper*: "The Application of Dry-Coke Cooling Plants to Integrated Iron and Steel Works," 103
Sawyer, C. F., and **J. W. Spretnak,** density variations in ingots, 151
Sawyer, F. A., high-pressure steam, 155
Saxena, M. N., elected Associate, 190
Saxton, R., carbide dies, 154; wire-drawing, 260
Scarpa, O., corrosion of underground pipes, 79
Schack, A., emissivity of combustion product, 55
Schane, P., jun., inclusions in steel, 374
Schaufus, H. S., I. C. Clingan, and **W. H. Braun,** working-up of stainless-steel sheets, 260
Schaum, J. H. *See* Fifield, J. E.
Schefels, G. *See* Kofler, F.
Scherer, W. W., welding of mill pinion, 157
Scheucher, K. *See* Crankshaw, E.
Schikorr, G., atmospheric corrosion, 392
Schimpke, P., and **H. A. Horn.** *Book*: "Praktisches Handbuch der gesamten Schweisstechnik," 400
Schirmer, R. W., fire prevention in by-product plants, 254
Schlitt, F. F. *See* **Armstrong, H. H.**
Schmidt, G. V., centrifugal casting of steel, 62
Schmidtmann, E. *See* Eilender, W.
Schmitz, O. *See* Hofmann, W.
Schneider, control laboratory for refractories, 254
Schneider, C., and **L. Ulsenheimer,** hardness testing, 72
Schneider H., planning of heat treatment operations, 377
Schneidewind, R., and **D. J. Reese,** malleable cast iron, 75
Schoefer, E. A., cast chromium steel, 272; heat-resistant castings, 389
Schofield, W. H., elected Associate, 190
Scholz, W. *See* Naeser, G.
Schover, D. S. *See* Mehaffy, W. R.
Schubert, H. R., *Paper*: Early Iron-working near Ticehurst, 16. *Paper*: "The Superiority of English Cast-Iron Cannon at the Close of the Sixteenth Century," 85. *Note*: Medieval Ironworks at Monmouth and Osbaston in Monmouthshire, 326; wealden iron industry, 173
Schuller, G. W., wood models, 174
Schuller, W. G., purchase of foundry patterns, 61
Schulte, F., oxidizing process in malleablizing, 22
Schulze, A. P., Bullard-Dunn process, 264 electropolishing of stainless steel, 264;

Schumacher, H., blast-furnace burdens, 148, 373
Schwaigerer, S. *See* Siebel, E.
Schwartz, H. A., blackheart malleable cast iron, 75
Schwarzkopf, P., sintering of metal powders, 267
Schwenn, C. W., mechanization in foundries, 62
Schwitter, C. M., nickel steels and cast irons for gears, 164
Scohy, corrosion of boiler plates, 79
Scortecci, A., elected Member, 189
Scott, D. A., W. M. Armstrong, and **F. A. Forward**, effect of nickel and molybdenum on austenite transformation, 166
Scott, F., and **E. W. Gilham**, corrosion of desuperheaters and feed pumps, 79
Scott, S., elected Member, 189
Scouse, S. J. *See* Holden, H. A.
Searle, A. B., *Book* : "Refractories for Furnaces," 80
Sedusky, H. J. *See* Mohler, J. B.
See, W. G., submerged combustion, 157
Seeger, G., notch effect on transversely drilled torsion bars, 71
Seegmiller, Emma. *See* Brenner, A.
Seeliger, R. *See* Hunger, J.
Seférian, D., *Book* : "Les Soudures," 176
Seiberlich, J., absorption of ferrous sulphate from pickling liquor, 382
Seidel, R. G., foundry correlation technique, 63
Seitz, F., physical metallurgy, 385
Senatoroff, N. K., corrosion prevention of gas pipe lines, 275
Senderoff, S., properties of electrodeposits, 68
Senior, E. W., biographical note, *facing* 80; elected Hon. Member of Council, 283
Senn, J., drawing dies, 260
Setzler, P. H., welding steel shafts to castings, 67
Seymour, H., cathodic protection of pipes, 79; plastic coating of oil well drill pipe, 383
Seymour, W., elected Member, 189
Shand, S. J., origin of magnetite, 54
Sharpe, R. S., elected Associate, 190
Sharritts, J. A., automatic moulding, 152
Shashkov, A. N., paraffining of microsection, 165
Shaw, J., heat treatment, 63; isothermal annealing, 378
Shaw, R. E., pretreatment of metals for painting, 69
Shaw, W. E. *See* Eickhoff, A. J.
Shchukin, P. A., sampling of coke, 146
Sheehan, J. P., C. A. Julien, and **A. R. Troiano**, transformations in nickel steels, 167
Sheen, M. K., elected Member, 189
Shephard, H. D. *See* Loria, E. A.
Shephard, H. D., and **E. A. Loria**, inclusions in tensile fractures, 161
Shepherd, F., elected Hon. Member of Council, 283
Sheridan, C. H. *See* Kiefer, G. C.
Sherratt, S., and **J. W. Linnett**, flame speeds in gaseous mixtures, 372
Shevelev, A. K., effect of boron in high-speed steel, 75
Shirley, H. T., and **J. E. Truman**, corrosion of alloy steels, 393
Shlumper, V. B., cast-iron specimens for compression tests, 71
Shnidman, L. *Book* : "Gaseous Fuels," 280
Shoosmith, G. T., elected Member, 189
Shore, L., elected Member, 189
Short, C. W., and **T. G. Meyrick**, effect of fuel-gas sulphur on sulphur removal in basic O.H. furnace, 58
Shortall, W. J. *See* McCrady, D. C.
Shpeizman, V. M., and **E. V. Elenevskaya**, graphite determination in wrought iron, 76
Shumilova, N. A., and **R. Kh. Burschtein**, passivation of iron, 393
Shvartsman, L. A. *See* Samarin, A. M.
Siebel, E., calculation of strength of steel structures, 268; plastic deformation, 379
Siebel, E., and **K. H. Bussmain**, notch effects under fluctuating loads, 72
Siebel, E., N. Ludwig, and **P. Melchior**, shape of wire-drawing dies, 260
Siebel, E., and **K. Rühl**, determination of proof-stress limit, 70
Siebel, E., and **S. Schwaigerer**, deformation limits, 268
Sieker, K. H., shaping of metals, 379
Simek, B. G., F. Coufalik, and **J. Choura**, coking tests, 372
Simkinson, T. V., arc furnace practice, 374
Simmons, A. L., H.F. treating, 64
Simmons, C. R., resin binders for moulds, 61
Simon, P., cast-iron crucible for precious metals, 61
Simon, P., and **G. Joly**, worm-shaft casting, 61
Simon, W. H., gas cutting of stainless steel, 381
Simoneit, K., and **W. Radeker**, centrifugal casting, 153
Simons, J. P., wax-melting experiments, 219
Simpson, B. L., early American foundries, 398
Simpson, V. A., and **G. K. Eggleston**, quality control of castings, 62; sound castings, 257
Sims, C. E., G. A. Moore, and **D. W. Williams**, hydrogen and nitrogen in steel, 375
Singer, A. R. E., deep drawing, 379
Sists, J. A., elected Member, 189
Skeehan, J. L., gear ratios for crane drives, 156
Skinner, G. M. *See* Gaines, J. M.
Skinner, R. A., elected Associate, 190
Skobets, E. M., I. D. Panchenko, and **V. D. Ryabokon**, polarographic analysis, 397
Skorski, R. *See* Benedicks, C.
Skulari, P., mechanism of hardening, 77
Smart, J., elected Member, 189
Smatko, J. S. *See* Fink, C. G.
Smet, G. de. *See* de Smet, G.
Smirnov, V. I., iron castings for turbine, 272
Smirnov, V. N. *See* Sorokine, A. I.
Smirnova, K. A., unfired acid refractories, 147
Smith, A., jun., cathodic protection of pipes, 394
Smith, A. J. Nicol, peeling of malleable cast iron, 25
Smith, A. Q., gas convection heating, 160
Smith, A. R., power generating equipment, 155
Smith, B. O., biographical note, 250; *see also* Carlisle, S. S.
Smith, C. Gordon, anti-corrosion paint for ships, 102
Smith, C. S., interpretation of microstructures, 77
Smith, D., *Book* : "Metalwork," 400.
Smith, D. P., *Book* : "Hydrogen in Metals," 400
Smith, E. C., direct reduction, 149
Smith, G. F., and **F. W. Cagle**, determination of aluminium in iron ore, 171
Smith, G. V. *See* Fitzgerald, R. C.
Smith, J., elected Member, 189
Smith, K. F. *See* Jackson, L. R.
Smith, L. A., silica brick, 147
Smith, P. D., elected Member, 189
Smith, R. A., heat treatment of dies, 64
Smith, R. P., equilibrium of alloys with methane and hydrogen, 165
Smith, S., flame hardening, 259
Smith, V., elected Member, 189
Smith, W. A., J. Monaghan, and **W. Hay**, slag basicity, 151
Smout, Sir A., elected Hon. Member of Council, 283
Snell, C. T. *See* Snell, F. D.
Snell, F. D., and **C. T. Snell**. *Book* : "Colorimetric Methods of Analysis," 400
Snyder, S. C. *See* Mears, R. B.
Snyder, W. T. *See* Waisman, J. L.
Sobers, W. B., analysis of malleable cast iron, 396
Sochevanov, V. G., determination of nickel and cobalt, 276
Soete, W., residual stresses in welds, 156
Sokolov, L. O., and **L. P. Zaitsev**, measuring impact force with electrical dynamometer, 71
Sokolov, S. Ya., supersonic tests, 388
Solakian, H., salt-baths, 63
Soldate, A. M. *See* Pauling, L.
Sorokina, N. N. *See* Borsova, A. V.
Sorokine, A. I., and **V. N. Smirnov**, cooling of forgings, 259
Sosman, R. B., temperature measurement in O.H. furnaces, 56
Sourdillon, effect of low-temperature treatment on metals, 75; heat-treatment, 153
Sourdillon, A., isothermal quenching, 65
Southgate, B. A., *Book* : "Industrial Waste Waters," 176. *Book* : "Treatment and Disposal of Industrial Waste Waters," 80
Sparr, W. H., design of steel parts, 273
Speight, G. E., determination of oxygen in liquid steel, 277
Speight, G. E., and **R. M. Cook**, determination of hydrogen in liquid steel, 277
Spek, J. van der. *See* van der Spek, J.
Speller, F. N., marine corrosion testing, 79
Spence, H. R. *See* Osborne, S. G.
Spencer, L. F., annealing furnace for stainless steel, 65; steels for forging, 260
Spencer, W. H., cupola explosions, 376
Spindler, W. A., centrifugal casting, 258
Spooner, Molly F. *See* Bishop, M. W. H.
Spretnak, J. W. *See* Fetters, K. L.; Sawyer, C. F.
Stach, O. R. *See* Geiger, C. F.
Stanage, R., elected Member, 189
Stanbery, L. J., and **J. M. Brennan**, billet-heating furnace, 63
Stanley, H. H., rolling of sheets, 155
Stanton, F. P. *See* Rankine, J.
Starkey, R. L., anaerobic corrosion, 168
Stauffer, R. A., vacuum metallurgy, 174
Stayman, T. H., rolling stock for iron and steel plant, 66
Steel, G., elected Vice-President, 283
Steele, J., production of ingot moulds, 258
Steer, A. T., exfoliation of electrodeposited surfaces 265; metallographic examination of electrodeposits, 391
Steffe, H. *See* Naeser, G.
Steiner, W. A. *See* Brewer, R. E.
Steinitz, R., permanent magnets from iron powder, 388
Stempfel, salt baths, 258
Stephenson, R. L., sound ingots, 374
Stephenson, V., elected Associate, 190
Stern, A. C., L. P. Benjamin, and **H. Golberg**, plastic beads in chromium-plating baths, 159
Stern, R. L., overheating of welding electrodes, 156
Stevenson, W. W., determination of inclusions, 277
Steward, E. G., high temp. high angle X-ray diffraction, 165
Stewart, J. A., manufacture of bolts and rivets, 65
Stiles, J. B., metallizing in foundry practice, 70
Stock, K., sand moulding, 60
Stockdale, W., elected Member, 189
Stockley, G. M., mineral resources of Tanganyika, 253
Stocks, W., elected Member, 189
Stoler, S. M., heating furnaces, 63
Stolze, G. A., investment casting, 377
Stone, F. G., single-crystal ferrite, 165
Stone, G. L. L., concentration of hematite, 372
Stone, M. D., cold rolling mills, 155
Stout, A. D., magnetic analyses, 172
Strasheim, A. *See* de Waal, D. M.
Strassburger, J. H., use of oxygen in iron and steel production, 58, 149

Stratford, W. H., acid O.H. process, 58
Streicher, M. A., phosphatizing, 69
Stringham, L. K., welding of parts for enamelling, 263
Stromberg, A. G., visual polarograph, 397
Stromberg, A. G., and **I. E. Bykov**, visual polarograph, 397
Stromberg, A. G., R. V. Dityakovskaya, and **N. V. Milovanova**, determination of copper and nickel in steel, 276
Strycker, R. de. *See* de Strycker, R.
Studders, R. J., stability of permanent magnets, 387
Sudarsanan, A. P., elected Associate, 190
Sudrabin, L. P., and **F. P. Macdonald**, cathodic protection, 395
Sully, A. H., G. N. Cale, and **G. Willoughby**, creep of metals under compression, 74
Surova, M. D. *See* Burshtein, R. Kh.
Sussex, A. G., protective finishes for radio equipment, 265
Svahn, O., machining of metals, 157
Swain, S. M., tests of refractories, 57
Swan, A. W., statistical department in steel industry, 174
Sweeney, W. O., and **H. L. Mattes**, investment casting, 377
Sych, V. Ya. *See* Maltsev, V. F.
Sykes, A. E. *See* Rylands, G. K.
Syrokomskii, V. S., oxidation-reduction potential of molybdenum, 392
Szczeniowski, J., metallic recuperators, 145

Tabarry, Miss A. *See* Dague, G.
Taguirov, K. Kh. *See* Chmanenkov, I. V.
Taher, S., elected Associate, 190
Taits, E. M., V. K. Letova, and **Z. S. Tyabina**, swelling of coal, 254
Talwalker, T. W. *See* Mitra, H. K.
Tananaev, N. A., analysis of dolomite, 275
Tananaev, N. A., and **V. I. Muracheva**, determination of selenium in steel, 171
Tani, A. *See* Cavallaro, L.
Tarnopol, L., and **J. R. Morgon**, damping capacity of steel, 388
Tatnall, F. G., wire strain gauge, 72
Taylor, J. W., elected Associate, 190
Taylor, W. F. *See* Lee, B. R.
Teeple, H. O., valve materials, 275
Tennivin, J. *See* Guinier, A.
Tenow, O., biographical note, 249; *see also* Benedicks, C.
Terenteva, E. P., non-destructive method of chemical analysis, 396
Tereshchenko, P. N., polarographic analysis, 397
Terrington, J. S., biographical note, 367; *see also* Mardon, H. H.
Thesinger, W. G., clad steel for oil refineries 395
Thews, E. R., deposition of metals by pyrolysis, 159; treatment of chips and borings, 373
Thiel, H. van. *See* van Thiel, H.
Thierry, P., and **M. Brun**, manganese in the blast furnace, 148
Tholander, E., annealing of steel, 153
Thomas, A. H., atmospheric corrosion testing, 167
Thomas, A. N., elected Member, 189
Thomas, M. *See* Butlin, K. R.
Thomas, R. D., jun. *See* Rozet, D.
Thomas, R. W. *See* Healey, M. V.
Thomas, W. G., elected Member, 189
Thompson, G. R., obituary notice, 369
Thompson, H., defects in steel, 70
Thornhill, R. S. *See* Mayne, J. E. O.
Thring, M. W., *Paper*: "Influence of Heat Transfer on Open-Hearth Furnace Charging Rate," 212; awarded Hadfield Medal, 365; glass furnace practice, 374; models for metallurgical research, 256; models for studying combustion processes, 372
Thum, A., and **Erker, A.**, design of welded joints, 380
Thurman, A. L. *See* Garwig, G. W.
Tietz, T. E. *See* Dorn, J. E.
Timmins, A. A., peeling of malleable cast iron, 31
Timoshenko, S., and **G. H. MacCullough**, *Book*: "Strength of Materials," 280
Tipper, C. F. Elam, fracture of steel plate, 161, 269
Tippett, J. M., submerged arc welding, 381
Tishchenko, N. A., electric driving of rolling mills, 260
Toerge, W. F., powder metallurgy, 267
Tolley, G., catalytic oxidation of sulphur dioxide on metals, 393; corrosion of metals by sulphur dioxide, 393; sprayed metal, 159
Tomashoff, N. D., corrosion of metals with oxygen depolarization, 78
Tomlinson, J. W. *See* Bockris, J. O'M.
Toot, D. F., steel and aluminium for automobile construction, 390
Topekha, P. K. *See* Kostetskii, B. I.
Torras, J., elected Member, 189
Townsend, L. W., stainless clad steel, 173
Traupel, W., heat conductivity of plates, cylinders and balls, 63
Trembicki, H. L., wire coatings, 260
Tret'yakov, F. E., effect of heat treatment on spot welds, 263
Triebeler, H., duplex process for malleable cast iron, 60
Troiano, A. R., transformation and retention of austenite, 166; *see also* Barnett, W. J.; Sheehan, J. P.
Trömel, G., and **H. Gedschold**, recovery of vanadium from slag, 57
Truman, J. E. *See* Shirley, H. T.
Tschalaer, A. *See* Brunner, G.
Tseitlin, L. A., plastic chrome refractories, 147
Tsylev, L. M., siderite ore in Russia, 253
Tucker, H. J., and **J. A. Monks**, heat-treatment furnaces for wire, 65
Tulcinsky, H. O., feedwater for boilers, 175
Tull, E. V., spheroidization of steel, 153
Turich, M. L. *See* Zarubina, O. V.
Turkdogan, E. T., awarded Carnegie Research Grant, 284
Turnbull, D., transient nucleation, 78; *see also* Fisher, J. C.
Turner, A. A. *See* Geiger, C. F.
Turner, F., elected Member, 189
Turner, R. S., moulding of cast magnets, 60
Turner, W. A., elected Member, 189; foundry equipment, 258; resin-bonded foundry sand, 258
Tuttle, H. A., and **F. R. Bryan**, spectrum analysis, 397
Tyabina, Z. S. *See* Taits, E. M.
Tyvaert, P., cleaning of sheets prior to enamelling, 157, 382; tinning cast iron, 159

Ubbink, J. H., Dutch foundry practice, 257
Udy, M. C., and **H. D. McIntyre**, temperature distribution in moulds, 61
Ulsenleimer, L. *See* Schneider, C.
Umanskii, M. M., S. S. Kvitka, and **Iu. A. Bagaryatskii**, X-ray crystallography, 391
Upton, V. E., elected member, 189
Usatenko, Yu. I., and **P. A. Bulakhova**, determination of manganese in iron ore, 171
Usatenko, Yu. I., and **O. V. Datsenko**, determination of calcium and magnesium in iron ore, 396

Vaill, R., iron ore in Brazil, 371
Valensi, G., formation of layers in dry corrosion, 170
van der Spek, J., iron content of Dutch soil, 54
Van Dyke, B. H., production of oxygen, 278
van Gilder, R. D. *See* Brewer, R. E.
van Loon, J., protective paints, 384
van Nooyen, P., resistance welding, 381
van Saut, R. W., diesel locomotives, 155
van Scoyoc, J. N. *See* Mehaffy, W. R.
van Thiel, H., manufacture of magnesite bricks, 57
van Wijk, F., heat treatment of tool steel, 378; isothermal diagrams, 78
Vasey, R. B., chainmaking, 67
Vasilev, G. G., determination of yield point of steel, 268
Vegnev, D. G., extension diagrams, 161
Verkhoshapov, A. I. *See* Dyatlov, A.
Vernon, W. H. J., British Corrosion Research Group, 170
Vié, G., silica bricks, 147
Villner, P. V. *See* Mörtsell, S.
Vivian, A. C., *Book*: "Essential Metallurgy for Engineers," 80
Vladimirskii, T. A., tensile tests with ring-shaped specimens, 70
Voder, J. D., H. Y. Carbonnier, and **A. H. Morris**, removal of silica from water softener, 399
Vodzinskii, I. V., anti-corrosive lacquer, 266
Vogel, P. C., foundry of Allis-Chalmers Manufacturing Co., U.S.A., 153
Voight, H. F., and **F. Eisel**, rail and structural mills, 154
Voigt, L. R., bibliography on salt spray tests, 395
Volkert, G., production of ferro-alloys in Germany, 376; reduction of ores in steel refining, 257
Voltz, P., German steel industry, 174
von Eijnsbergen, J. F. H., anti-fouling compositions, 99; phenolic-resin coatings, 97
Vonsovsky, S. V., electric conductivity of ferro-magnetic substances, 270
Voronin, N. I., and **E. C. Podzolova**, induction furnace linings, 147
Voroshilova, A. P. *See* Mikheev, M. N.
Vvedenskii, T. A., hardness tests of pinions, 162; Rockwell hardness tester, 387
Vylomov, V. S., carbon monoxide indicator, 173

Waal, D. M. de. *See* de Waal, D. M.
Wachter, A. *See* Barnum, E. R.
Wahl, H., wear of metals, 73; wear resistance of welded deposits, 156
Wahl, H., and **K. Gebauer**, wear of chromium coatings, 158
Wahlquist, H. W., zinc for cathodic protection, 168
Wahlquist, K. D., and **O. Osborn**, cathodic protection by magnesium, 395
Wahlström, S. L., Swedish iron and steel exports, 79
Waisman, J. L., and **W. T. Snyder**, tempering of steel, 154
Walford, J. G., elected Member, 189
Walker, J., drawing dies, 154
Walker, L., elected Associate, 190
Walker, W. F., forming of stainless steel, 379; heat treatment of stainless steel, 378; joining of stainless steel, 381; machining of stainless steel, 157
Wallbank, A. W., German electroplating practice, 265
Wallquist, G., roll-calibration, 154
Walton, E. T. *See* Ruhnke, D. H.
Warburton, H., tinning of cast iron, 383
Ward, A. M., corrosion of steel by ammonium sulphate, 395
Wardle, A. J., jun., levelling machines, 261
Wardner, W. C., coking practice, 146
Waring, H. W. A., elected Member, 189
Watson, E. H., elected Associate, 190
Watson, Mary, *Book*: "Sheffield—Its Story and its Achievements," 176
Watson, P., elected Member, 189
Webber, H. M., brazing of metals, 67, 381
Webster, G. R., and **A. E. Probst.**, *Paper*: "Peeling of Whiteheart Malleable Iron." *Discussion*, 17
Weck, R., residual stresses in welds, 156

Weir, R. C., elected Member, 189
Weiss, J. G., high-carbon steel wire, 260
Weiss, K., infra-red absorption power of metals, 163
Weiss, S., American coking industry, 146
Wells, C., and **R. F. Mehl**, transverse strength of steel, 268.
Wells, J. H. *See* Wilson, P. J.
Welter, G., deformation under longitudinal impact, 385
Wendel, F. de. *See* de Wendel, F.
Werkmeister, O. *Book*: "Das Schleifen und Polieren der Metalle," 280
Werneck, H. A., induction furnaces for iron smelting, 57
Wernick, S., *Book*: "Electrolytic Polishing," 80
Wernick, S., and **F. Willetts**, electrodeposition of nickel, 265
West, G. W. *See* Michell, D.
Westover, C. E., foundry costs, 79
Wheeler, J. A. *See* Jaswon, M. A.
Wheeler, N. E., spot welding mild steel, 66
White, A. E. *See* Fitzgerald, R. C.; Reynolds, E. E.
White, G. L., foundry of Galt Malleable Iron Co., 376
White, H. C., biographical note, 367; *see also* D. F. Marshall
White, J. *See* Murray, P.
White, M. P., and **LeVan Griffis**, plasticity in uniaxial compression, 72
White, W. H., and **A. R. Elsea**, high silicon cast iron, 271, 389
Whitehead, D. J., elected Associate, 190
Whitehead, E., elected member, 189
Whiteley, H. A., drop-forged crankshafts, 154
Whiteley, J. H., manganese-sulphide inclusions in steel, 273
Whittemore, O. J., jun., oxide refractories, 373
Wickert, K., inhibitors in pickling, 67, 382
Wickert, K., and **H. Pilz**, solubility of iron in hydrochloric acid, 393
Wieberdink, A., magnetic permeability of nickel–iron, 163
Wiele, B., forging of rolls, 379
Wier, F. C., handling of materials, 175
Wieschhaus, L. J., disposal of pickling liquor, 382
Wiester, H. J. *See* Koch, W.
Wijk, F. van. *See* van Wijk, F.
Wilder, A. B. *See* Fitzgerald, R. C.
Wilder, A. B., and **J. O. Light.**, stability of steel at high temperatures, 389
Willan, J. H. G., pickling acids, 382
Willard, H. H., L. L. Merritt, jun., and **J. A. Dean**, *Book*: "Instrumental Methods of Analysis," 400
Willert, H., iron ore in Germany, 54
Willetts, F. *See* Wernick, S.
Willey, R. A., and **J. B. Caine**, analysis of foundry sand, 278
Williams, C. D. B., chromium plating of cylinder bores, 265
Williams, D. W. *See* Sims, C. E.
Williams, G. E., *Book*: "Technical Literature," 80
Williams, N. T., elected Member, 189
Williams, R. R., jun., ore-treatment plant of Colorado Fuel and Iron Corp., 253
Williams, R. S., and **V. O. Homerberg**, *Book*: "Principles of Metallography," 280
Williams, W. J., awarded Carnegie Research Grant, 284
Williamson, L. J., elected Member, 189
Willis, G. M., thermodynamics in study of reactions, 150
Willis-Jones, E., elected Associate, 190
Willoughby, G. *See* Sully, A. H.
Willson, R. T., rolling-mills of Republic Steel Corporation, 155
Wilshaw, C. T., isothermal hardening, 378
Wilson, G., drop forging, 379
Wilson, J. M., surface activity of lubricants, 262
Wilson, P. J., and **J. H. Wells**, ammonia recovery, 56
Winchester, A. J., electrical equipment for Weirton tinplate mill, 155
Winkler, T. B., elected Member, 189
Winning, J., determination of carbon and sulphur, 396
Winterbottom, A. B., thin films, 169
Winzer, Alice, and **G. F. Carrier**, discontinuity surfaces in plastic fields of stress, 72
Wishart, H. B., and **R. K. Potter**, residual stresses in hollow cylinders, 269
Woldman, N. E., fatigue of aircraft parts, 269
Wolf, P., blast-furnace profiles, 255
Wolfe, G. F., welding of ore bridge, 157
Wolverson, T., elected Member, 189
Wood, C. E. *See* Barrett, E. P.
Wood, H. R., anti-fouling compositions, 99; cementiferous paints, 101
Woodcock, F. L., *Book*: "Designs of Metal Cutting Tools," 176
Woods, S. E., gaseous reduction of iron ores, 148
Woodward, G. R., nodular cast iron, 257
Woolridge, E. F., belt conveyors, 362
Wormwell, F., T. J. Nurse, and **H. C. K. Ison**, tests of paints for under-water service, 267
Worner, H. K., "secondary" metallurgy, 173
Wranglen, G., electrolytic iron powder 384
Wray, P. R. *See* Ruhnke, D. H.
Wright, C. C., and **W. J Reagan**, anthracite in cupolas, 257
Wright, R. H., twin-motor drives for cold mills, 261
Wusatowski, Z., roll pass design, 261
Wyart, J. *See* Guillaud, C.
Wyss, U., effect of bainite in chromium–molybdenum steel, 389; elected Member, 189; heat treatment terms, 63; *see also* Gerber, W.

Yakovlev, P. Ya., determination of molybdenum in ferromolybdenum, 172
Yakovleva, E. S., and **M. V. Yakutovich**, cracks in steel, 73
Yakutovich, M. V. *See* Rybalko, F. P.; Yakoleva, E. S.
Yarworth, N., elected Associate, 190
Yohe, G. R. *See* Reed, F. H.
Young, G. F. M., quality control, 158
Young, K. O., elected Associate, 190

Zagorodskikh, D. M., cold brittleness of steel under tensile test, 70; steel tougness under compression, 161
Zaitsev, G. P., ballistic testing machine, 385
Zaitsev, L. P. *See* Sokolov, L. D.
Zakharov, I. I. *See* Ratner, S. I.
Zambrow, G. L., and **M. G. Fontana**, properties of alloys at low temperature, 273
Zapffe, C. A., discovery of stainless steel, 173
Zapffe, C. A., and **M. Eleanor Haslem**, hydrogen embrittlement of steel during pickling, 264
Zapffe, C. A., and **R. L. Phebus**, inverse chill in cast iron, 377
Zarubina, O. V., and **M. L. Turich**, corrosion of metals in sulphur dioxide, 395
Zepter, K. H. *See* Gleichmann, H.
Zetserov, Y. M., shaping of refractory blocks, 147
Zeyen, K. L., welding rods, 156, 262
Zheleznyakova, Sh. R. *See* Rauzin, Ya. R.
Zhigadlo, A. V., magnetic powder tests, 163
Zhitkov, D. G., endurance testing of cables, 76
Zhuk, E. M., vibration-interrupted arc, 172
Zhukova, P. N. *See* Mikheev, M. N.
Ziebolz, H., combustion control, 372
Ziegler, N. A., W. L. Meinhart, and **J. R. Goldsmith**, molybdenum–vanadium steel, 272
Zimmerli, F. P., effect on fatigue of quality of shot for peening, 72
Zingg, E., elected Member, 189
Zinzen, A., boiler practice in Germany, 54
Ziuskin, N. M., photometric study of surfaces, 76
Zlatin, N. *See* Merchant, M. E.
Zmeskal, O. *See* Gilman, J. J.
Zoja, R., inclusions in iron, 77; metal-scale layer in steel production, 256
Zuethoff, A. J., alloys for gas turbines, 271